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The Outlook

Tangible Propaganda

THE display given by the Air Forces of various countries at Evere aerodrome in connection with the aeronautical exhibition at Brussels was certainly suggestive. French, German and British formations gave demonstrations, and the experts of each duly noted the merits of all the others. Nobody could have watched without admiration the appearance of a squadron of Wellingtons and the evolutions of a Hurricane, and such sights must have encouraged our friends and impressed those who may not be so friendly. To us British it was likewise very comforting to see the French Armée de l'Air make such a good showing with their Bréguets, Moranes, and so forth. Such displays must help to discourage aggression and preserve the peace.

We cannot always arrange to have a squadron from one of the Axis Powers as spectators when we thus show our teeth, but surely it would be a good thing if there were a little more inter-Allies publicity. Of recent months the British public has watched with concern the efforts of France to make up for lost time and bring her air strength up to a due level, and the reports which have reached us have not always been encouraging. Likewise, we ourselves have had and are still having a great race against time while expanding our Air Force, and the French people may not be aware of how great our success has been. The visit of squadrons of Wellingtons, Hampdens, Blenheims, Hurricanes and Spitfires to Paris is therefore very timely. It would be a very good thing if those squadrons were to make a tour of parts of France, partly for tactical reasons, to get familiar with the country. We should also like to see some of the best French escadrilles visit Britain. Tactically, it is more necessary for our airmen to become acquainted with the country of France than for French pilots to get to know England; but it would have a very cheering effect on our people to see for themselves that our French friends are now really formidable in the air.

Opening Time

IN the ordinary way, the celebrations involved in the official opening of an aerodrome serve to remind the local residents that both the landing ground (provided at great cost to them) and the fighting Services are in very thorough existence. An excuse, in fact, for a first-class air display and a good deal of speechmaking.

Whether the work on the site is only half complete, or whether it was actually completed eighteen months before, is neither here nor there. Some aerodromes have been "opened" twice, or even three times, and most of them have been in use for some considerable time prior to the ceremony. The only people likely to be troubled by the display and the consequent closing of the aerodrome to all and sundry are a few amateurs.

But with the increasing size and importance of the centre, the opening date becomes more important. A six-hour *verboten* period can be a considerable nuisance, and even if the radio-controlled arrivals and departures of machines on regular services are permitted, the pilots are not likely to relish the idea of entering an area in which the sky may be full of Service formations—or equally full of one amateur demonstrator intent on showing a machine off to the best possible advantage.

To take an extreme case, imagine the effect of an official opening of Croydon airport in the summer of 1939. The whole of Europe's air traffic system would be dislocated. Last Saturday's affair at Elmdon had no such repercussions, but it was no end of a nuisance for the airline companies already using this aerodrome. The effect lasted only one day, it is true, but should any airline companies be encouraged to use an aerodrome before the buildings are complete, and should an aerodrome be opened before everything is ready? On some future occasion the question may be an important one—on points of principle as well as convenience. Not long ago a very incomplete aerodrome was duly and officially blessed; presently we shall have opening ceremonies on ground which has only just been levelled—or even just been purchased.

A Notable Year

THE year 1938 was a good year for civil flying. The report on its doings has just been issued in a cover which invites perusal, and so is in happy contrast to most Government publications. The year was not one which could be called epoch-making, but it saw steady progress combined with a certain amount of wise planning for the future. The despatch in July last year of the first Empire class flying boat to carry "all-up" mail to Australia marked the completion of the original Empire air mail scheme. The word "completion" is perhaps not too well chosen, for in the development of civil air transport there is no finality. The extension of British air services to Australia under the scheme for "all-up" mail was only the starting point for new plans of extension to New Zealand and on across the Pacific to Vancouver. Still, it was a great thing to get letters to Australia in under nine days and to Hong Kong in six days at a cost of 1½d. per half-ounce.

During the year British commercial aircraft flew over thirteen and a half million miles on regular routes.

Provision for the future was represented mainly by the orders placed by the Air Ministry for the Short and Fairey landplanes which have been discussed in these columns. It is to be hoped that the next report by the Director General of Civil Aviation will be able to refer to these machines under the heading of successful achievements.

Eighteen Months Ago

AN expenditure of eighteen pence at His Majesty's Stationery Office will enable those of enquiring mind to learn all about the health of the Royal Air Force in the year of grace 1937. The purchaser must be very fond of figures who would browse deeply in the *Nosiological Table for Home, Abroad and Total Force*, considering what ancient history those tables have now become. It must be granted that the drawing up of the numerous tables and percentages and incidences (not angles thereof) represent a lot of mathematical labour, but who wants to know that there were 128 cases of disease of the teeth and gums in 1937?

The little blue book entitled *Report on the Health of the Royal Air Force for the year 1937* is not, however, all dry statistics. Under the heading of Physiology there is a very interesting paragraph which tells us that during the year in question investigations were carried out on the problem of those who are unable to learn to fly within a reasonable time; that this inability is held to be partly inherent, and that it might be discovered beforehand so as to avoid waste of time and money, and that investigations were in progress. The results of those investigations ought to be very interesting, and we should very much like to know how the matter stands at the present moment. But we shall presumably have to wait another eighteen months before that information reaches us.

TAKING-UP FORMATION: Especially during the air exercises last week-end, quite large formations of Wellingtons have been in evidence. Even a quartet of these impressive aeroplanes makes an inspiring spectacle

THE BRUSSELS SHOW

Britain Very Much to the Fore : Military "Novelties" : Direct-injection Engines from Germany

(Illustrated with "Flight" photographs)

EPITOMISING the tremendous efforts made by her aircraft industry, Great Britain takes pride of place at the Second International Aeronautical Exhibition which opened on Saturday and which is continuing in the Palais du Centenaire, Brussels, until July 23.

Most visitors from this country are expressing surprise at the extent of the show, though, as might be expected in these times, the "innovations," particularly on the military side, are somewhat dated. Happily the most attractive machine, from both academic and aesthetic viewpoints, is British. This is the "Speed" version of the Spitfire which might now have held the world's speed record had not Germany produced the astonishingly fast Heinkel He 112U and Messerschmitt Me 109R, information on which is as hazy as the photograph of the Messerschmitt hung among the German exhibits.

The majority of the aircraft and engines are already known to readers of *Flight*, and no useful purpose would be served by setting out a catalogue of their characteristics. Neither shall we attempt to list every exhibit by name, for the purpose of our visit was not so much to compile a matter-of-fact inventory of the material which the various companies are exhibiting as to form some idea of current technical progress.

FIGHTERS

There is no marked divergence from normal practice in the design of fighters, though both single- and twin-engined classes are exemplified by some comparatively recent models. The special Spitfire, which is on view for the first time, closely resembles the normal "eight-gun job" which now equips a number of R.A.F. squadrons, though certain measures have been taken to improve on the top-speed figure of 367 m.p.h. credited to the Service version now in production. The Rolls-Royce Merlin has been boosted to confer maximum performance near the ground, and the blade roots of the De Havilland variable-pitch airscrew have been faired. Actually it had been announced by the Air Ministry that the machine would be equipped with a four-bladed "prop."

The Wellington I, on the Air Ministry stand, is the largest aircraft in the Show

Beautifully faired and strikingly finished—the Speed Spitfire (specially boosted Merlin). Note the faired roots of the D.H. airscrew blades

which despite official reticence in imparting information, may be assumed to be of the wooden, fixed-pitch variety.

The cockpit enclosure has been extensively revised, particularly the forward portion, and one bay appears to have been deleted from each wing panel, giving the wings an even lower aspect ratio than normal. Finish is really superb, the machine being painted a glossy royal blue with a silver lightning streak down the fuselage and the markings "N17."

But the most delightful modification—and one which will astonish those who think that the Air Ministry lacks a sense of humour—is the deletion of the external radiator, which, to cool the "hotted-up" Merlin within generally accepted limits, would have to be of generous proportions. This change brings the machine into line, ostensibly at least, with the German record-breakers. Altogether this Supermarine is the most "elegant" machine on show and retains the typical Spitfire individuality.

This quality, however, is not confined to the Spitfire. Belgium herself presents the Renard R.37 single-seater fighter which exhibits some unique characteristics. The low monoplane wing, for example, has a prominent root fairing not only on the trailing edge but at the front. This feature accentuates the sturdy appearance of the machine, which is placarded as having a *coefficient de securité* of 13.5; it can well be believed on examining the structure. The fuselage is of square-section tubing.

The model shown has a French Gnome Rhone 14N 14-cylinder radial wrapped in one of the most attractive (but needless to say, daring) long-chord cowlings ever exhibited. This has the merest suggestion of an annular inlet for the cooling air though the extracting outlets are appropriately large. The in-line Rolls-Royce Merlin and Hispano Suiza 12Y have been successfully fitted, the former, according to manufacturer's claims, offering Spitfire-like performance.

The Renard concern has never been guilty of plagiarism in the design of its military aircraft and this new fighter does Belgium considerable credit. Despite the aerodynamic and structural eccentricities of the machine it will be difficult to surpass it in all-round excellence.

The Hawker Hurricane shown on the British Air Ministry stand has flown 300 hours in service and looks little the worse for it. Official literature gives a top speed of 320 m.p.h., though it is generally claimed that the Hurricane is good for rather more than this. A standard Hurricane centre section and a metal-covered wing look reassuring.

The "Protectorat Bohéme/Moravie" contributes the business-like Avia 35 single-seater. The prototype has a Hispano vee-twelve, though series-built machines are getting either the Avia HS Y29 or Avia HS Y1,000-1,200 unit. Features are the horseshoe-shaped radiator in an English-looking tunnel and the leading edge finned oil cooler. The version shown has a retractable undercarriage and is fitted with a 20 mm. engine-mounted shell-gun and two synchronised 7.92 mm. machine guns. Up to 220 kg. of bombs can be carried.

France has sent one of the sturdy-looking Bloch 151 C.1s, actually No. 21 off the production line. These are *bicanon* machines in which the pilot sits well forward.

Two-seater fighters are represented by a pair of machines which in general layout resemble each other quite closely. These are the Fairey P.4/34 on the stand of Avions Fairey and the Sabca S.47 (Caproni licence). The Fairey has one

Exhibited in semi-mock-up form at the last Brussels Show, the Renard R.37 fighter (Gnome-Rhone 14N) now appears like this. A Merlin can be installed

of the new Merlin RM2Ms with two-speed blower and Rotol airscrew and, so it is said, one of the most efficient ducted radiator installations ever developed for a Rolls-Royce engine. Actually, the machine is one of the bomber versions built as a prototype for the R.A.F. and appeared at the last R.Ae.S Garden Party. It is here being considered as a fighter because Denmark has ordered an eight-gun version, which is particularly interesting as the new British two-seater fighters—the Boulton Paul Defiant and the Blackburn Roc—have all their armament concentrated in a power-worked turret and have no fixed weapons at all.

The Sabca, which can be used for other duties besides fighting, has a form of ejector exhaust system for the twelve-cylinder Hispano *moteur canon*. In this the front and rear of the four ejector nozzles exhaust the first and last cylinders, while the centre pair connect each with a pair of cylinders.

A spiteful-looking twin-engined fighter is the French Hanriot N.C. 600, developed from a prototype which originally appeared at the Paris Salon with two vee-twelve Renaults. As shown, and as now in production for the French Air Force, the machine has the diminutive Gnome-Rhone 14MS with an interesting ducted exhaust system. The accommodation has also been revised and the pilot has an unusually good view forward.

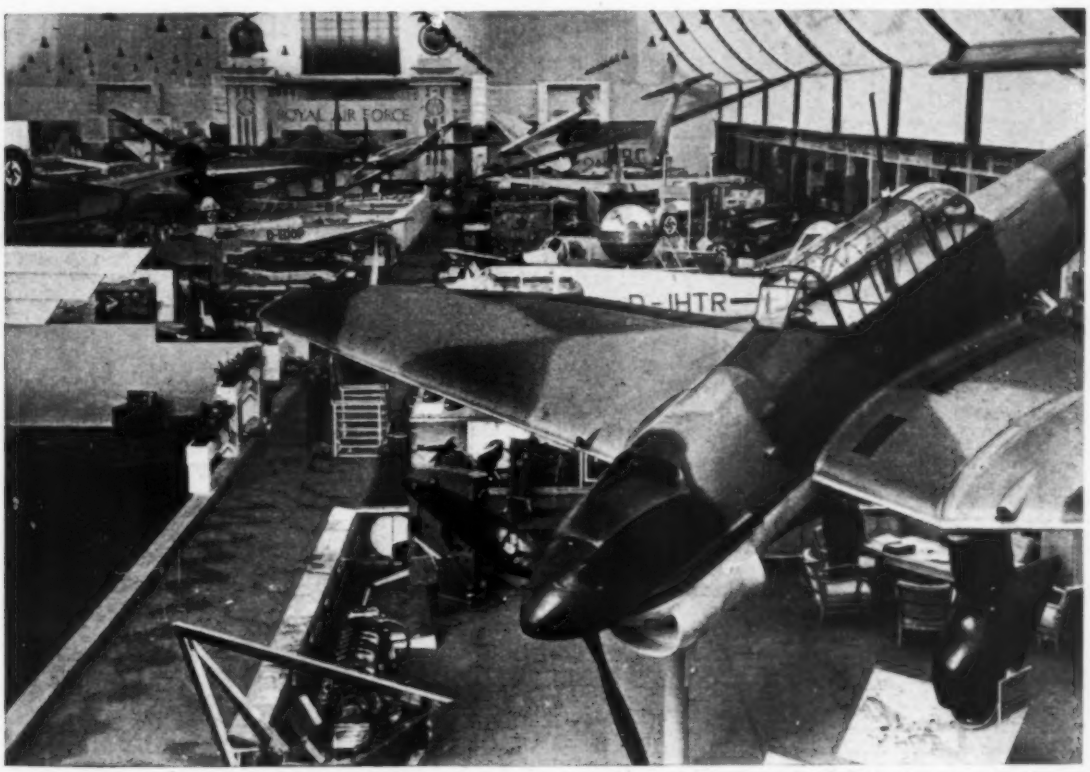
The N.C. 600 probably does nearer 350 than 300 m.p.h.

BOMBERS AND MULTI-PURPOSE TYPES

A bomber which, at a pinch, can be used as a two-seater fighter is the Junkers Ju.87, an example of which is on exhibition for the first time, though this unconventional monoplane has, for some while, been standard equipment in the Luftwaffe and was, in fact, employed fairly extensively in Spain.

Primarily, the machine was designed to handle a bomb load of 250 or 500 km. in bombing dives up to the vertical, and has special air brake slats for limiting its diving speed, under the wing just behind the leading edge. The wing, which has the typical Junker's "double wing" arrangement, is "cranked" and the undercarriage is fixed and spatted. The engine is a Junkers Jumo 211 vee-twelve (1,220 h.p. for take-off), though the first machines of the type to go into service had the less powerful Jumo 210. A Swartz-bladed v.p. airscrew is used, and there is a somewhat unusual oil-cooler duct in the top of the cowling. Armament includes two fixed guns and a free gun at the back of the cockpit enclosure. A single large bomb is carried under the fuselage and has an appro-

The Fairey P.4 has the new Merlin RM2M with Rotol airscrew



A general view of the Show, with the Junkers Ju.87, exhibited for the first time, in the foreground.

A British quartet impressively grouped : the Speed Spitfire, Hurricane, Oxford and Wellington.

priate ejector arm arrangement to ensure that it clears the airscrew. Smaller bombs are carried outboard under the wings.

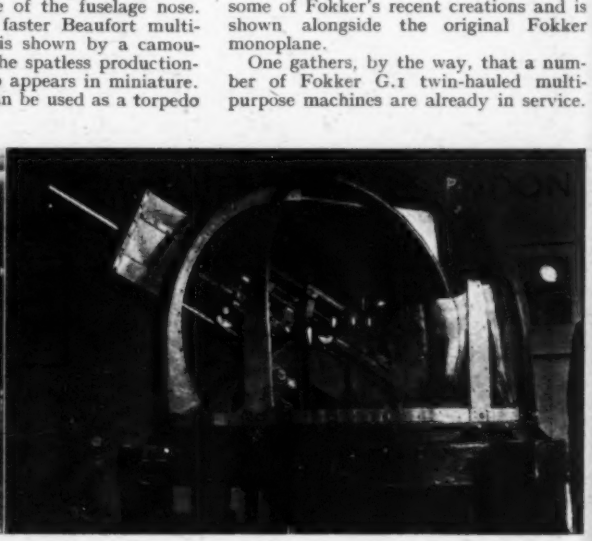
The Ju.87 looks rugged and adaptable, but must, in these days, be considered "bitty" unlike, for example, the Blackburn Skua, which is also a *Sturzkampfflugzeng*.

It is a little disappointing that Germany has not sent a Dornier Do.215 bomber, for in this type, more even than in the Do.17, the crew is grouped together in the front part of the fuselage. The Do.215, however, is represented by a model as is its British counterpart, the Bristol Blenheim. Incidentally, whereas the Bristol has sprouted a long nose the redesigned Dornier proboscis is suggestive of early Blenheim practice.

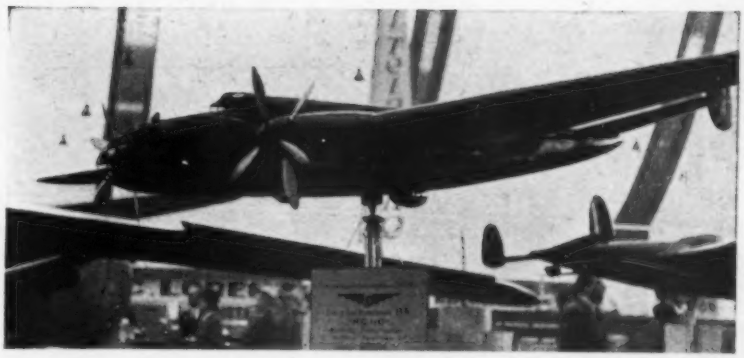
The popularity of the Blenheim continues on the Continent, and Captain Bartlett explained some of the variations in equipment requested by purchasers. The Ikarus concern, which holds a licence for the construction of the Blenheim in Yugo-Slavia, had the first machine of this type flying eight months after receiving drawings. It is possible, by the way, to mount a fixed or semi-fixed shell-gun on the starboard side of the fuselage nose. The heavier and faster Beaufort multipurpose machine is shown by a camouflaged model. The spatless production-type Bombay also appears in miniature.

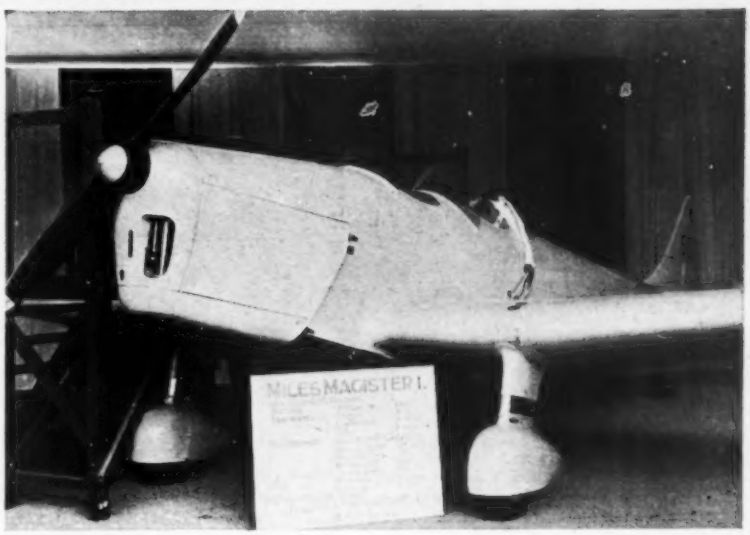
The Beaufort can be used as a torpedo carrier and represents a new approach to the problems associated with this class of machine. Fokker has produced, and exhibits, a coastal defence torpedo carrier which has less than half the power of the Bristol (two Wright whirlwinds) and a twin-float undercarriage. The torpedo traps are open to show how the "fish" is carried internally. This machine, designated the T.8-W, has been ordered in quantity by the Netherlands Navy. It looks rather less war-like than some of Fokker's recent creations and is shown alongside the original Fokker monoplane.

One gathers, by the way, that a number of Fokker G.1 twin-hauled multipurpose machines are already in service.



(Left) Pause for personalities : Capt. K. J. B. Bartlett, Bristol Continental representative, chats with Mr. H. K. ("Hawker") Jones, whose appointment as managing director of Armstrong-Siddeley Development and its subsidiaries is announced this week. (Right) The new American Armaments Corporation shell-gun, shewn by W. S. Shackleton, Ltd., in conjunction with Sterling Electric Holdings, Ltd.





A model of the projected French NC 110, which will have four Hispanos in tandem pairs driving concentric airscrews. Below it will be recognised a well-tried British trainer—the Miles Magister

And not, it is suggested, only in Holland, for the Czech Letov concern acquired the licence long ago and in fact shows a model and a photograph of an almost identical machine arranged for reconnaissance and having a fixed undercarriage, and two Walter Sagitta vee-twelve engines. Another story is that two dozen green G.1's (Pratt and Whitney-powered) which should have gone to Spain, are sitting all forlorn in a hangar in Holland.

The G.1 is a counterpart of the French Potez 63, one version of which is available for close inspection. This has been arranged for observation or reconnaissance and has a little observation "car" beneath the fuselage, and a transparent panel under the nose. The characteristics of this attractive and versatile machine are otherwise known to readers.

Of the bombers none is coming in for so much admiration as the geodetic-built Vickers-Armstrong Wellington I on the Air Ministry stand. This will carry an unstated bomb load for 3,200 miles and is capable of 265 m.p.h. Sqn. Ldr. D. F. W. Atcherley (in charge of the stand) and P/O J. C. Gates are kept busy answering questions about this formidable craft.

Possibilities in the design of high-speed bombers are illustrated by models among the French exhibits. The NC110 will have four Hispano 12YS arranged in tandem pairs in two nacelles and driving concentric airscrews. A smaller machine, the NC150, is to have two special Hispano 12YS with NC-C1 superchargers, which sustain the output at 860 h.p. at 10,000—not feet—but *metres*.

A strange machine will be the Loire Nieuport 10, a large naval floatplane with some Blohm and Voss characteristics except that the two engines are placed *above* the monoplane wing.

The Swastika-marked Letov S.50 light twin-engined observation monoplane arrived by air from what was once Czechoslovakia. Some notes on this model have already been published, but the machine is well worth studying if only because there is an interesting "tunnel" gun position underneath. The S.50 is what the French would call an *avion de travaille*, and has obviously been designed to "take it."

MILITARY TRAINERS

British military trainers are well represented by an Airspeed Oxford, the Miles Magister, and the new twin-engined Reid and Sigrist, which for "snappiness" of design (and in the matter of performance for power) would be hard to beat. We shall not discourse on the already familiar features of these aircraft, which are certainly in the very front rank of Service trainers.

Koolhoven presents the latest F.K.56 two-seater trainer with a low gull-wing, the main panels of which correspond to the mid-position. With a Siddeley Cheetah X the Koolhoven does nearly 200 m.p.h. Its characteristics have already been discussed in *Flight*.

The Stampe et Vertongen SV5 trainer, shown carrying its full military equipment, is a creditable biplane albeit of unexciting appearance. It is a standard type in the Belgian Air Force and, like the Koolhoven, has a Siddeley Cheetah.

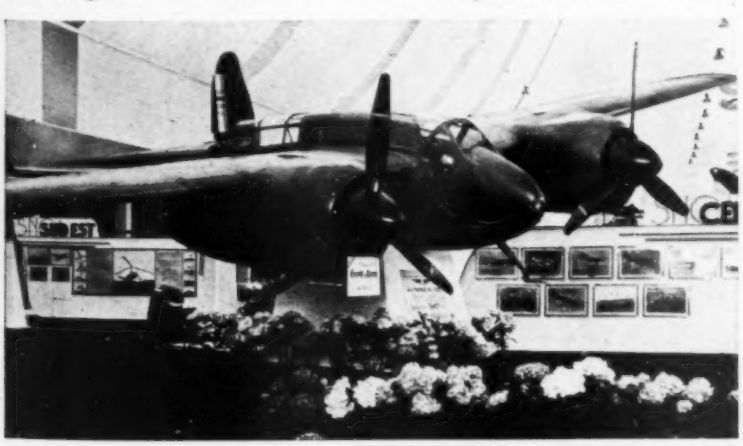
THE CIVILIAN MINORITY

A link between the purely military machines and the small civil types which complete the exhibition of aircraft is the newest Messerschmitt 108 (Taifun), which, although primarily a high-speed personal transport, is also offered as a fighter trainer. It is an exceptional aeroplane, as explained recently in *Flight*, but is appallingly expensive.

Germany offers something quite new in the Klemm Kl105 side-by-side low-wing two-seater with a 50 h.p. Zündapp. Everything inside is neat and tidy as on an American car, and with the Klemm experience behind it the machine should handle well.

The manufacturers of the little Tipsy monoplanes, which, of course, originated in Belgium, may well be pleased with their showing of the tandem, side-by-side and single-seater models. These are not only easy on the eyes, but perform in quite a startling manner considering their low power.

Another attractive little civilian is the Arado Ar.79 with 105 h.p. Hirth. This has a high-class finish and offers exceptional visibility, windows stretching below the waistline. The low seating position may tend to be uncomfortable on long trips. The wheels tuck up be-



Hanriot over the hydrangeas : the NC 600 twin-engined fighter.

The Reid and Sigrist Trainer ; Sqn. Ldr. Reid will, perhaps, be recognised standing nearby

neath the pilot's and passenger's knees.

The little tandem Zlin., from the Protectorat Bohème/Moravie, seems about the same as ever, though in many respects it is rather overshadowed by the De Havilland Moth Minor, which sits prettily among the D.H. engines, airscrews and models.

Fitted with a 140 h.p. Renault, the Sabca S.40 tandem two-seater looks as though it should have a good performance in the aerobatic category.

Next week we shall publish photographs of the British engine and accessory exhibits, which were dealt with in a forecast in last week's issue.

The twin-Zündapp Gotha and the square-cut but practical-looking Siebel 202 (Hummel) represent two of Germany's recent efforts in the light-aircraft field. The Siebel, incidentally, is shown with our old friend the little nine-cylinder Salmson radial.

In addition, there is a small selection of the unexciting or over-exciting aerodynes which always lurk in obscure corners of these big exhibitions.

A just-after-the-last-moment arrival was the General Aircraft Cygnet, flown over on Sunday by Mr. Hollis Williams. It seemed certain that its tricycle undercarriage, in particular, would cause plenty of interested comment among Continental visitors.

ENGINES

It was, of course, well known that the Germans were developing engines with direct petrol injection, but it comes as something of a surprise to find that all the high-powered engines which they exhibit work on this principle. The radial B.M.W. 132's and the Bramo Fafnir carry the injector pump with the accessories on the rear cover, while the inverted-vee twelve Daimler-Benz D.B. 601 Aa has it between the cylinder banks. The air manifold is of oval shape on this engine and air is taken directly into the impellor of the side-mounted supercharger. It is interesting to note that one of the first high-powered engines to which direct injection was applied experimentally was the Pratt and Whitney Hornet, from which the B.M.W. is developed. Two large intake pipes facing forward between the cylinder banks feed air to the blower on the B.M.W. 132, and two butterfly valves, one operated by the throttle and the other by an automatic control, vary the amount of air taken in. To maintain a balance in the fuel-to-air ratio, an oil-operated servo mechanism interconnected with the throttle, controls the fuel feed and another control operates the second pair of butterfly valves already mentioned. An advantage of the direct injection engine, besides the accurately metered fuel supply, is its ability to start at once from cold without priming. Experiments have been made at temperatures of 20 deg. C. below zero. It was rumoured, however, that engines already in service with direct fuel injection must be stripped down every twenty-five hours—for reasons unstated.

Apart from Germany, the French S.N.C.M. concern have provided for direct injection on the Algol radial and supercharged Sterna vee-twelve engines. Hispano-Suiza, on the 12Y series of in-line vee engines, still favour a blower on the "outside" of the induction system, supplying air to six synchronised Solex-type carburettors.

The only C.I. engine is the well-known Junkers opposed twelve-piston Jumo 205, which is shown together with the inverted vee-twelve model 211, both exhibited part-sectioned.

General Milch, the German Under-Secretary for Air, was not alone in his admiration of the Bristol Taurus engine and the other British engines, which included the Pegasus XVIII, the Napier Dagger VIII; the D.H. range from Twelve to Minor; Rolls-Royce Merlins III and X; the Alvis Pelides and Leonides; Armstrong-Siddeley Cheetah X; and Cirrus. Alvis have recently designed thoroughly modern unit mounting and bulkhead for the small Leonides. All pipe joints and couplings are of the quickly detachable plug type, and a complete engine unit can be changed in two hours.

Hispano-Suiza and Gnôme Rhône exhibit well-known models and no further details are given about the very large Hispano H engine or the three-speed supercharger which maintains power at 30,000 ft. on the 12 Y engine. S.N.C.M. give no hint that they have a big new engine under development.

Walter, who offer by far the greatest number of models of any manufacturer, are present in full force, their stand fairly bristling with large and small radials, and in-line motors.

The German Argus company continue with the 90 deg. vee-eight and comparatively new vee-twelve engines. Hirth show similar motors, of which the 280 h.p. fan-fed 508 D, in a Taifun, has just taken its class altitude record.

Direct-injection from Germany : the B.M.W. (left), with forward-facing air intakes, and Bramo Fafnir (right) with intake at side.

THE EVERE DISPLAY

Belgium's Air Force Celebrates Quarter-century : Brilliant Flying and New Aircraft

(Illustrated with "Flight" Photographs)

THE aerodrome at Evere, just out of Brussels, was the rendezvous last Sunday of some of Europe's most brilliant military pilots and some contrasting new Service aircraft.

Organised to mark the twenty-fifth anniversary of Belgian military aeronautics, the display was watched by the King of the Belgians, who was accompanied by Princess Joséphine-Charlotte and surrounded by a distinguished and splendid company of diplomats and high-ranking officers of the armed forces of Europe, among whom Air Chief Marshal Sir Cyril Newall, Chief of the Air Staff, represented the Royal Air Force.

By way of salutation a flight of Fairey Fox fighter-reconnaissance biplanes of the Belgian Air Force flew low and slowly over the packed enclosures, towing the flags of the five nations represented. At this time the severity of the bumps augured badly for subsequent formation work, and visitors were becoming conscious of the layer of dust settling everywhere.

The dashing entry of five closely formating Belgian Firefly fighters dispelled the irritation of this annoyance. These fascinating little Faireys went through a well-planned programme of aerobatics which was marred only by the inability, for reasons unknown, of one of the wing machines to maintain position. The King of the Belgians arrived as the Fireflies pulled out low from a loop. Their break-up was perfectly timed and delightful.

Faireys—18 Hispano-powered Foxes from Nivelles—again took the stage, presenting some polished formations including a "flights astern" and an "arrow," the shaft of which had been timed up by the time the formation reached the Royal enclosure.

Under Captain Trubenbach, nine grey Bücker Jungmeister single-seater aerobatic trainers of the *Luftwaffe* took off for an impatiently awaited show. As they approached for their first fly-past the leading flight of these delightful little biplanes rolled over and led the formation for the length of the aerodrome—and well beyond—flying on their backs. The Bückers' repertoire included exemplary loops, *fleurs de lis* and those most effective manœuvres, loops in line astern at the top of which one or two of the Jungmeisters had to be coaxed to keep formation. One appeared to stall.

The main formation then dispersed to make way for individual demonstrations, during which Captain Wille met his death. He had executed two astonishing flick rolls and was completing a third when he appeared to stall and the Bücker dived out of sight behind a hangar on the far side of the aerodrome. The Captain is said to have been very severely injured, and he died shortly afterwards. Meanwhile the Bückers went on rolling and looping.

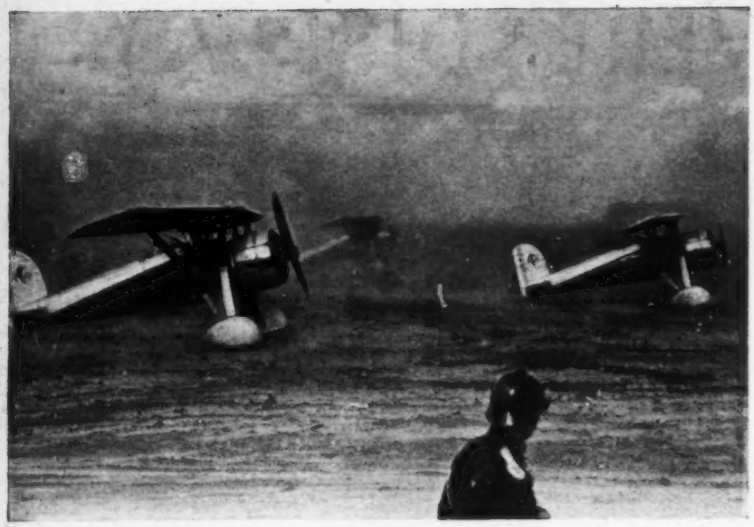
Tied aerobatics by three Belgian Gladiators recalled many similar shows seen in England on these machines which (though "we says it as shouldn't") is praise enough. Captain Arend, Adjutant Janssens and 1st Sergeant Delorme went through most of the usual manœuvres and did great credit to their Service.

Then followed one of the most perfect demonstrations of mass aerobatics it would be possible to visualise. The machines were parasol Moranes (225s), the unit the famous *Patrouille de l'Ecole de l'Air d'Etampes* under Captain Fleurquin.

As the main formation took off, a separate Morane slipped beneath it like a "stooge" in a comedy act and immediately rolled on to its back. Thence-

"Escadrille de 9 avions Vickers-Wellington—vol en échelon refusé vers la droite."

A picture from which a moral might well be drawn—the chiefs of the air forces of three nations: Gen. Milch, Gen. Vuillemin and Air Chief Marshal Sir Cyril Newall.



To say that this picture is reminiscent of 1918—or perhaps of an American war film—casts no very serious reflection on the design of the French Morane 225s, seen taxi-ing out over the dusty aerodrome. They performed brilliantly.

forth the fun was fast and furious. "Fun" because these superb pilots of *l'Armée de l'Air* seemed always to fly with their tongues in their cheeks—and as often as not with their wheels in the air. They rolled in vics and echelons. They rolled individually and in small units and large. And they went on rolling until necks were cricked and superlatives exhausted. When they seemed to have finished they embarked on a fresh series of even more fantastic tricks, and when they were not rolling they were looping, bunting or motoring leisurely along on their backs or the sides of their fuselages. Ordinary Squadron loops meant nothing; it was considered necessary to embark on these evolutions with the leading flight inverted, giving a combination of $\frac{3}{4}$ loop and $\frac{1}{4}$ bunt. Never have aeroplanes looked more completely at home in their element. They taxied in covered with glory and dust.

Some of the more fortunate of the spectators had seen the Etampes Moranes at previous shows and there was a feeling that it was about time that France demonstrated some of her modern monoplanes. And demonstrate them she did. Three each of the following new standard Service types had been brought over: Morane 406 single-seater fighter with Hispano 12Y *moteur canon* and two machine guns; Breguet 690 attack machine fitted with two Gnôme Rhône Mars small-diameter radials; and Lioré et Olivier 45 bomber with two of the big Hispano radials of over 1,100 h.p. each.

The Morane monoplanes showed that although they are not so fast as our Hurricanes and Spitfires they are quite capable of engaging any bomber now in service. They "aerobatted" very prettily and flashed past the Royal enclosure at negligible height but by no means negligible speed.

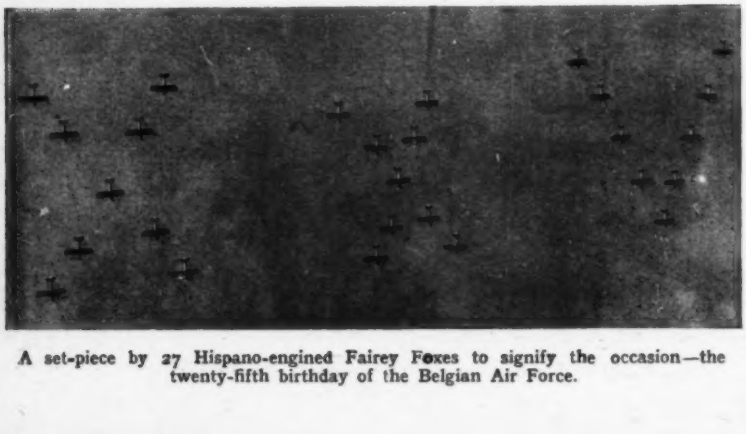
The big Liorés, which might be considered in size as between a Hampden and a Wellington (though they are said to be considerably faster than either), looked very elegant and fast and their pilots were not afraid to show their form in the vicinity of sea level

Flt. Lt. Reynell's aerobatic display on a Hawker Hurricane was one of the high-spots of the meeting.

Never have the capabilities of a modern twin-engined military monoplane been more convincingly demonstrated than by the three delightful little Breguets. These are of individual appearance and their high-revving Gnôme Rhônes have closely wrapped long-chord cowlings with very small inlets and trailing edge oil coolers. The 690 can be used as a fighter, ground attack machine (for which the French Air Force will employ it extensively), bomber or reconnaissance and does nearly 300 m.p.h.

It would be impracticable to list the names of all pilots participating at the Evere meeting, but one feels impelled to record that the three Breguets were handled by Captain Rozanoff, Commandant Amouroux and Captain Ladousse. This trio, after demonstrating the aerobatic and general handling qualities of the Breguets, repeatedly "shot up" the aerodrome from heights between 25 and 50 feet and at speeds which must have bettered 350 m.p.h. and put the reportedly delicate little Gnômes "through the gate" without mercy.

Formation by nine Fairey Battles of the Belgian Air Force.



A set-piece by 27 Hispano-engined Fairey Foxes to signify the occasion—the twenty-fifth birthday of the Belgian Air Force.

By and large, France put up the most impressive show of the day.

After the whizzing Breguets the passage of nine Belgian Fairey Battles which did formation flying seemed leisurely though they were, of course, well throttled back and were flying relatively high. The formations were really good and the final break-up, with Battles turning out in two diverging streams, was unusually effective.

Britain's main contribution was No. 9 Squadron, R.A.F., flying Vickers Wellington I long-range bombers, under the command of Wing Commdr. H. P. Lloyd.

As already inferred, conditions were not good for formation work and, everything considered, the Wellingtons did very well, though there were one or two gaps in their ranks at awkward moments. They did "vic," "squadron," "flights line astern," and "echelon," but kept quite high. One low fly-past at speed might have made all the difference between a passable show and something for the good people of Belgium to remember.

The Union Jack was not allowed to droop. A single R.A.F. Hurricane fairly leaped in the air (the take-off suggested 100-octane fuel) and was many hundreds of feet up when it crossed the enclosures. Piloted by Flt. Lt. R. C. Reynell, of Hawkers, this machine gave an exhibition which drew uncontrolled applause. Even more impressive than Reynell's upward rolls were his vertically banked turns, which must have applied many a "G."

False Alarm

At one moment horror swept through the whole assembly; the Hurricane was diving vertically with engine off when two very large sheets of flame licked along the fuselage. But Reynell pulled out and rocketed past, whipping over into a vertical turn at fantastic speed. It seems that there was a sudden escape of oil from the airscrew mechanism, and the lubricant flashed-off as it touched the exhaust manifold.

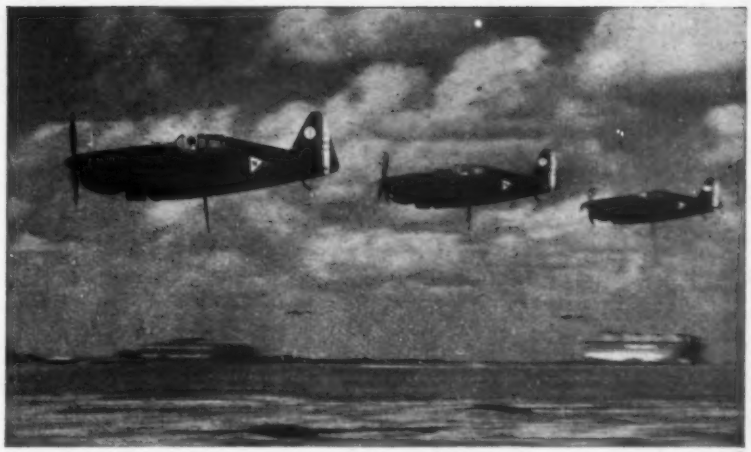
Hurricanes also acquitted themselves well in the hands of three Belgian pilots. A manœuvre well worth watching was the converging of the two wing machines at high speed from a great distance and their crossing over near the third machine. Belgium has adopted the Hurricane as a standard fighter and her pilots are worthy of its superb qualities.

Seven Polish P.Z.L. Los bombers scheduled to appear failed to arrive, but three Swiss pilots took off to represent their country, though their Fokker biplanes did not lend themselves to a startling demonstration.

Lieutenant Philippart put up an extremely good aerobatic show on a Belgian-built Stampe et Vertongen S.V.4 biplane with Gypsy Major engine. Particularly creditable were his sickening whip stalls, which caused the machine to behave like a pendulum; his bunts; and a circuit of the aerodrome, rolling all the way. Pilot and machine seemed really first class.

After a perfect formation take-off a squadron of Belgian Gladiators went through a comprehensive programme of advanced formation aerobatics, including "follow-my-leader" loops. This event, perhaps more than any other, illustrated the skill of the Belgian Air Force pilots.

While all the Belgians were aglow with just pride, 27 Hispano-Foxes flew over, forming "XXV"—an appropriate *finale*.



Three Morane 405 fighters of the French Air Force make a low fly-past.

Another Belgian display with British equipment—Belgian Air Force Gladiators.

Three more new French types that aroused plenty of interest—the LeO 45 bombers.

THE ROYAL AERO CLUB

News and Official Notices for the Week Ended July 8

THREE important flying meetings are due to be held at the end of this month and intending participants are reminded that the entry forms should be forwarded without delay.

Entries for the Deauville Air Rally from July 22 to 24 can still be accepted. Last year this rally was one of the most successful held, both from the point of view of entries and of entertainment.

The Plantagenet Rally, which is being held at Angers the same week-end, also promises to be most enjoyable. The closing date for this Rally has been extended to July 15. It is hoped that those private owners who are attending Deauville will fly on to Angers and take part in the Anglo-Angevin Festivities on Monday and Tuesday, July 24-25. The President of the Aero-Club de l'Ouest de la France extends a very cordial welcome to all visitors by air to this rally.

A third meeting is the Boulogne Rally, which takes place on July 29 and 30, on the occasion of the inauguration of the new airport. Entries for this Rally may be received up to July 20, and the fees of 100 francs per person include accommodation in one of the best hotels in Boulogne and Wimereux.

Racing in Germany

THE full regulations of the second International Flying Meeting organised by the NS-Fliegerkorps at Frankfurt-on-Main on July 29-30 are now available. Races open to German and foreign aircraft will take place on Sunday, July 30, after eliminating heats held on the Saturday. One race is for aircraft capable of over 200 km/hr. (122 m.p.h.) and equipped with engines of over 550 h.p. A second race is for aircraft capable of between 140 km/hr. (87 m.p.h.) and 200 km./hr., with engines of 170 h.p. The entry fee is 10 RMs. and forms must be received by the Royal Aero Club for transmission to the Aero-Club von Deutschland by July 14 at the latest. Late entries cannot be accepted in the case of foreign aircraft.

The racing machines will be handicapped in accordance with estimated performance and on the performance shown during the eliminating heats. Full details are available from the Secretary of the Royal Aero Club, and pilots wishing to take part should forward their entries as soon as possible.

Keeping it Up

FIGURES now available for the month of June show that steady progress is being maintained in the training of C.A.G. pilots by the light aeroplane clubs. During the past month 506 Aviators' Certificates were issued by the Royal Aero Club, compared with 99 for the corresponding month last year. The total of Certificates issued to date this year is already 2,187 against a total of 1,172 for the whole of 1938.

Gliding Certificates also show a steady increase, though not such a spectacular one. A very encouraging feature is, however, the number of completed tests for the distance, height, and duration requirements for the "Silver C" which have already been received by the British Gliding Association. It is hoped that by the end of the year last year's figure of 20 "Silver Cs" will be comfortably exceeded.

Gliding Height Record

AN inspection of the barograph charts carried by Mr. P. A. Wills on his flight at Dunstable on July 1 indicates that the height he attained was 14,170 ft. above the point of release. He thus beat his own previous record by 4,090 ft. The claim for the official recognition of the new record will be placed before The Committee of the Royal Aero Club at its next meeting. An interesting fact is that this flight was carried out at Dunstable during the visit of over 100 members of the Royal Meteorological Society.

Aviators' Certificates

No.	Name	Club or School	Date
18,811	Harold Radcliffe Philpot ...	South Coast Flying Club...	22.6.39
18,812	Jack Bow ...	Romford Flying Club	22.6.39
18,813	Herbert William Roud ...	Romford Flying Club ...	22.6.39
18,814	Ernest Joseph Martin ...	Northants Aero Club ...	22.6.39
18,815	Maurice Joseph Brennan ...	Isle of Wight Flying Club	22.6.39
18,816	Albert Frederick Sheen ...	Romford Flying Club ...	22.6.39
18,817	Douglas Gatward ...	London Aeroplane Club..	23.6.39
18,818	Walter Gatward ...	London Aeroplane Club..	23.6.39
18,819	William Henry Richard Iliffe ...	Air Service Training, Hamble.	23.6.39
18,820	William Arthur Crosswell ...	Airwork Flying Club ...	23.6.39
18,821	Neville John Pierce Wadley ...	Brooklands Flying Club..	23.6.39
18,822	Alfred Leonard Russell ...	South Staffs Aero Club ...	23.6.39
18,823	Daniel Francis Leahy ...	Wiltshire Flying Club ...	23.6.39
18,824	George Reginald Bayley ...	Plymouth and Dist. Ae. C.	24.6.39
18,825	Arthur Ernest Hann ...	Exeter Aero Club ...	24.6.39
18,826	Victor Patrick Law ...	Southend Flying Club ...	24.6.39
18,827	James Walter Morton ...	Southend Flying Club ...	24.6.39
18,828	Eric Ward ...	York and Leeming F.C ...	24.6.39
18,829	Stanley Gordon Barnes ...	Airwork Flying Club ...	24.6.39
18,830	James Cartwright ...	Northern Aviation Club...	24.6.39
18,831	Robert Burns ...	North Staffs Aero Club ...	24.6.39
18,832	Harold Herbert Hipperson ...	Norfolk and Norwich Ae.C.	24.6.39
18,833	Donald Westbrook Allen ...	London Air Park F.C. ...	24.6.39
18,834	David Marcus Batley ...	Yorkshire Aeroplane Club	24.6.39
18,835	George Leslie Hawkins ...	Airwork Flying Club ...	24.6.39
18,836	Charles William De pledge Leach	Doncaster Aero Club ...	24.6.39
18,837	George Richardson ...	County Flying Club ...	24.6.39
18,838	Kenneth Griffith Templeton ...	Scottish Flying Club ...	24.6.39
18,839	Rupert Alan Forsberry ...	County Flying Club ...	24.6.39
18,840	Albert William Sherlock ...	Airwork Flying Club ...	26.6.39
18,841	Frederick George Elliott ...	Coventry Aeroplane Club	26.6.39
18,842	Margaret Joan Long ...	Doncaster Aero Club ...	26.6.39
18,843	Frances Maureen Haywood	Southend Flying Club ...	26.6.39
18,844	Alfred Hayward Waters ...	Southend Flying Club ...	26.6.39
18,845	Alec Ungless Emery ...	Southend Flying Club ...	26.6.39
18,846	Thomas Edward Llewellyn Lloyd	University Aero Club ...	26.6.39
18,847	Malcolm Bardsley Warbreck Howell.	University Aero Club ...	26.6.39
18,848	John Howard Harrison ...	University Aero Club ...	26.6.39
18,849	Gillian Lorne Campbell ...	University Aero Club ...	26.6.39
18,850	George Stanley Milligan ...	University Aero Club ...	26.6.39
18,851	Kenneth Athol Perkin ...	University Aero Club ...	26.6.39
18,852	Leonard Edmund Roles ...	Cambridge Aero Club ...	26.6.39
18,853	Michael Robert Alston ...	Cambridge Aero Club ...	26.6.39
18,854	Alexander Cecil Pitman ...	Cambridge Aero Club ...	26.6.39
18,855	Raymond Elvey Smith ...	Cambridge Aero Club ...	26.6.39
18,856	Leonard Hilary Horlase Pearce...	Cambridge Aero Club ...	26.6.39
18,857	John Eustace Rowlett ...	Cambridge Aero Club ...	26.6.39
18,858	James Alexander Reid Falconer...	Cambridge Aero Club ...	26.6.39
18,859	Howard Alfred Armstrong ...	Eastbourne Flying Club...	26.6.39
18,860	Eric Routh...	Eastbourne Flying Club..	26.6.39
18,861	Charles Brian Fabris Kingcome...	Royal Air Force	26.6.39
18,862	Harold Stanley Conworth Fish ...	Reading Aero Club ...	27.6.39
18,863	Doreen Forrester Addie	Cinque Ports Flying Club	27.6.39
18,864	Leslie Herbert May	Bedford Aero Club ...	27.6.39
18,865	Edgar Henry Horn	Portsmouth Aero Club ...	27.6.39
18,866	John Frederick Stanley Hime ...	Yapton Aero Club ...	27.6.39
18,867	Ernest Cecil Hare...	Malling Aero Club ...	27.6.39
18,868	Henry Eric Waters	Malling Aero Club ...	27.6.39
18,869	John Robert Eldridge	Malling Aero Club ...	27.6.39
18,870	Leslie Victor Lawrence	Malling Aero Club ...	27.6.39
18,871	Harold Phillip Calvert	Herts and Essex Ae. C. ...	27.6.39
18,872	Cyril Edward Vinson	Herts and Essex Ae. C. ...	27.6.39
18,873	John William Lawson	Herts and Essex Ae. C. ...	27.6.39
18,874	Frederick James Box	Herts and Essex Ae. C. ...	27.6.39
18,875	Harold George Adams	Horton Kirby Flying Club	27.6.39
18,876	Richard Stanley Pavey	Horton Kirby Flying Club	27.6.39
18,877	Lewis Evans	Horton Kirby Flying Club	27.6.39
18,878	Leslie John Victor Cotton ...	Horton Kirby Flying Club	27.6.39
18,879	Frederick Henry Naish	Southend Flying Club ...	27.6.39
18,880	Joseph Ellis Ginn	Southend Flying Club ...	27.6.39
18,881	Allan Arthur Atkinson	Southend Flying Club ...	27.6.39
18,882	Frank Albert Nutter	Blackpool and Fylde Ae.C.	27.6.39
18,883	Percy George Mills	Cotswold Aero Club ...	28.6.39
18,884	Richard Mervyn Echlin Crofton	London Air Park F.C. ...	28.6.39
18,885	Neville Hood Linzee	London Air Park F.C. ..	28.6.39
18,886	Stanley Edwin Woodington ...	London Air Park F.C. ...	28.6.39
18,887	Douglas Hamilton Raphael ...	West Suffolk Aero Club ...	28.6.39
18,888	Ernest Graham Oakley	Hampshire Aeroplane Club	28.6.39
18,889	Andrew Charles Lang Hodge ...	Plymouth and Dist. Ae. C.	28.6.39
18,890	Michael George Gladwell	Plymouth and Dist. Ae. C.	28.6.39
18,891	Anthony Roger Laurie	Horton Kirby Flying Club	28.6.39
18,892	Clifford Leonard Holdup	Witney and Oxford Ae. C	28.6.39
18,893	John Maxtone Graeme Williamson	Luton Flying Club ...	28.6.39
18,894	Edwin Allen Thompson	Bristol and Wessex Ae. C.	28.6.39
18,895	Cyril James Pinney	Luton Flying Club ...	28.6.39
18,896	Ernest John Hurst	Airwork Flying Club ...	28.6.39
18,897	Thomas Findley Priest	Autogiro Flying Club ...	28.6.39
18,898	Norman Ernest Jordan	Tollerton Aero Club ...	28.6.39
18,899	Richard Charles Woodhead ...	Tollerton Aero Club ...	28.6.39
18,900	John Matthew Johnson	Tollerton Aero Club ...	28.6.39
18,901	Alfred John Davis...	Tollerton Aero Club ...	28.6.39
18,902	Kenneth George Lyddon ...	Insurance Flying Club ...	28.6.39
18,903	Sidney George Wesson	County Flying Club ...	28.6.39
18,904	David Sinclair	Isle of Wight Flying Club	28.6.39
18,905	Richard Charles Brown	Cotswold Aero Club ...	28.6.39
18,906	Arthur Gerald Woodward ...	Cotswold Aero Club ...	28.6.39
18,907	David Francis Woodbine Parish	Exeter Aero Club ...	28.6.39
18,908	Geoffrey Trickey Salter	Exeter Aero Club ...	28.6.39
18,909	Gordon Sutherland Grant ...	Strathtay Aero Club ...	28.6.39
18,910	Antony Frenkel	Horton Kirby Flying Club	28.6.39
18,911	Llewellyn Lewis Jones	Horton Kirby Flying Club	28.6.39
18,912	Jack Reginald Morrey Rusdell ...	Horton Kirby Flying Club	28.6.39
18,913	Terence Joseph Sherriff	Romford Flying Club ...	28.6.39
18,914	Roy Alfred Farrup	Romford Flying Club ...	28.6.39
18,915	Henry Alexander Lambert ...	Reading Aero Club ...	29.6.39
18,916	Roy Derwent Stirk	Romford Flying Club ...	29.6.39
18,917	William Richard Paulson... ...	Thanet Aero Club ...	29.6.39
18,918	Thomas Erskine Aird	Strathtay Aero Club ...	29.6.39
18,919	Kinsey Llewellyn Pugh	Midland Aero Club ...	29.6.39

CLOUDSCAPE

TWO inspiring aerial impressions by John Yoxall, *Flight's* chief photographer. On the left will be recognised nearly all the characteristic features of a thunder-cloud. The aircraft is Capt. Edgar Percival's Mew Gull.

THE AERONAUTICAL BOOKSHELF

Not-so-Nice People

"The World Owes me a Living," by John Llewelyn Rhys; 7s. 6d., Faber and Faber.

THE novelist who embarks on a book with an aviation theme bats on a sticky wicket; either he knows so little about flying that he only dares to employ it as a sketchy background (and even then usually manages to give himself away) or, more rarely, knows so much about it that the aviation swamps the story.

In a previous book, *The Flying Shadow*, Mr. Rhys struck a fairly happy medium. About this one we are not so certain. It is a story woven round the joy-riding, circus, and record-breaking racket, and although the author's technical accuracy is unquestionable, one feels a vague dissatisfaction with the story—probably because all the characters are such a thoroughly unlikeable crowd. Some of the idiomatic, cynical, slangy dialogue looks irritating and unconvincing; yet trying it aloud leads to the reflection that we have met plenty of flying people who do talk exactly like Mr. Rhys' intemperate pilots and hard-bitten blondes.

Italian Anthology

"Il Volo in Italia." (Anthology of Italian writings on flight). Compiled by Federigo Valli and Antonino Foschini. Editoriale Aeronautica, Rome, 1939. Lire 10. (Can be ordered through any of W. H. Smith's branches.)

FOR those who read Italian, here is an intellectual treat. For those who do not, the illustrations provide a feast which in itself makes the book worth buying: eight superb colour plates and hundreds of photogravures, comprising classic frescoes, medieval pictures, statuary, cloudscapes, the futurist aero-paintings which are such a feature of modern Italian art, and even line-drawings made by the airmen themselves. Every student of aviation will thrill at the facsimile of Leonardo da Vinci's notes on bird-flight.

The letterpress follows a logical sequence. First come classical and medieval legends; then early projects, balloon ascents, and essays with helicopters and parachutes. Next, the actual conquest of the air; then the Great War and the "record-flying" period immediately following it; and the Abyssinian and Spanish wars. A final section is devoted to general literature of flight.

The compilers have shown catholic taste. Side by side with Dante, Tasso, Alfieri, and d'Annunzio, we find pilots, journalists, and even ordinary letter-writers. Certainly, if the selection is representative, Italian aeronautical journalism ranks as literature, but this might be expected—self-expression comes easily to the Italians, and through flying they satisfy their love of colour and drama.

A good anthology is like a box crammed with jewels. You may pick out a handful at random—as here one might pick Pascoli's poem, "Andrée," Barzini's "First Crossing of the Alps," "Civinini's "Dash to Cattaro," "Foschini's "Hero" (the death of Baracca)—but the rest are just as enchanting. Someone else may make a different choice and be equally happy.

Our only criticisms are that, though d'Annunzio is well represented, his most soul-stirring paragraphs have been missed; and that General Nobile's own account of the North Pole airship expedition would have been a better choice than a mediocre journalist's story of the preliminary flight to Stolp. But the one criticism is a matter of taste, the other of politics. Perhaps Dr. Valli should rather be complimented on his courage in including any reference at all to a pioneer who, because he met with misfortune, is out of favour with the Powers-that-Be.

What Isn't Done

"Customs of the Service (Advice to those newly commissioned)," by A. H. S.; 2s. 6d. (Gale and Polden, Ltd., Argyll Street, London, W.1.

THIS book is very definitely intended for officers of the R.A.F. who have received short-service commissions or have been commissioned from the ranks. Others need not pay close attention to it. It sets forth the unwritten laws of etiquette in the officers' mess and elsewhere. On the whole the advice is given with judgment and tact, though one can hardly help smiling at the dictum: "Nothing is more deplorable than to hear a junior officer addressing his Commanding Officer as 'Old Boy.'" We decline to believe that any newly commissioned officer of the R.A.F. needs to be told that. Still, we can very confidently recommend the book to those for whom it is intended.

More Meteorology

"Meteorology for Aviators," by R. C. Sutcliffe. 7s. 6d. Published by His Majesty's Stationery Office.

APART from Mr. W. H. Pick's standard book covering the more important aspects of meteorology, official publications on this subject have been limited to the various pamphlets which are put out by the Meteorological Office and published by H.M.S.O. Recently an entirely new and excellent book has been published by the same Office, dealing more or less exclusively with those parts of the subject which are of importance to pilots and navigators. *Meteorology for Aviators* has been written by an experienced instructor—and examiner, which is more important, since the book is designed primarily to cover the various licence syllabuses.

As such volumes can be, it is essentially readable, and mathematical formulæ have been almost entirely avoided. Since it is, nevertheless, intended to serve as a textbook, it is divided into three natural sections. The first covers the organisation involved in the provision of the necessary aviation meteorological services, with a description of the instruments used and their operation. Forecasting, and the problems normally presented by weather changes, are dealt with in the second part, while at the end of the book there is a comparatively short survey of the conditions usually experienced throughout the world. In a pocket inside the back cover is a copy of the Meteorological Office's Form 2459, which offers instructions for the preparation of weather maps and gives tables of the various specifications and symbols used. On the last four pages is a list of the various authoritative publications issued by the Meteorological Office through the Stationery Office.

Left Behind

"Aeroplanes and Aero Engines," by P. H. Sumner; 15s., Technical Press, Ltd., 5, Ave Maria Lane, London, E.C.4.

THE first edition of this work had its shortcomings but was more or less up to date. This latest version, retaining as it does rather too much of the earlier material, has quite an archaic air, in spite of the spasmodic injection of a Merlin, a Mercury or a Spitfire. Nevertheless, the author has been painstaking and gives a very fair insight into the elements of aeronautics.

Service Legalities

"600 Questions and Answers on Air Force Law," by Sqn. Ldr. H. M. Shurlock, of the Office of the Judge Advocate-General, and of Lincoln's Inn, Barrister-at-Law; 5s., Gale and Polden, Ltd.

THE qualifications of this author should ensure that the contents of this book are accurate, and it would be useless for anyone of fewer qualifications to criticise it. It has all the appearance of being useful to R.A.F. officers, as Air Force law is a subject which the ordinary officer finds more puzzling than the piloting of an aeroplane. This book is clearly written, and is easier to follow than are some manuals on the same subject.

From the American Angle

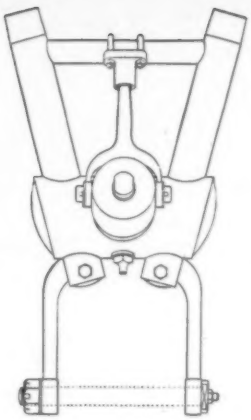
"Aeronautic Radio," by Myron F. Eddy; $4.50, The Ronald Press Company, New York.

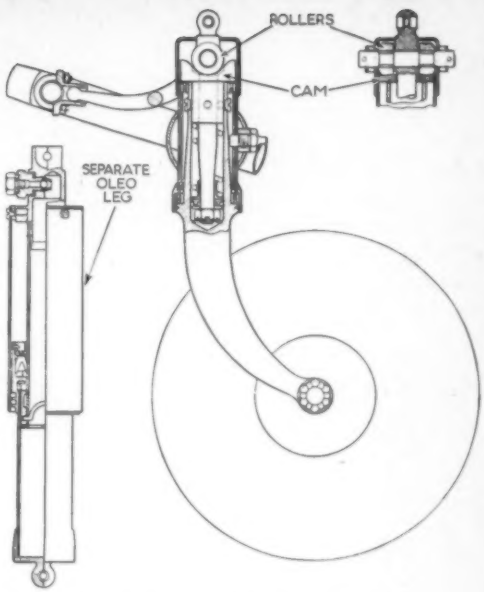
DURING the past year or two there has been a tremendous increase in the number of books covering specialised aviation subjects. This particular volume is essentially for American wireless operators and pilots, but it will be of interest to those wireless technicians in this country who are intent on knowing everything possible about means and methods in different parts of the world. The author deals with the elementary side of wireless transmission and reception fairly quickly, and then plunges into the genuine technicalities.

Probably the most useful sections are those describing certain comparatively modern items of equipment. Among these are the cathode-ray direction-finding receiver and the four more or less standardised types of instrument approach equipment. These are the old Bureau of Standards method, the Air Track system, the well-known Lorenz—as typical of the ultra-high-frequency deformed beam class—and the rather newer Bendix system. The chapter on radio-range beacons is educative—though it would seem that such beacons had passed their period of maximum usefulness and are likely to be very largely replaced even in the United States by D/F stations—while that on American traffic control methods offers one or two new ideas.

IMPROVING the TAIL WHEEL

British Landing Gears' New Design : Its Effect in Practice





These three drawings show (left) a plan view; (centre) the oleo leg, which is separate and is therefore subjected to no side-thrust ; and (right) the wheel unit ; the cam increases the centring action in direct ratio to the load.

WITH the idea of obviating some of the difficulties which have been, and are, experienced with tail wheels on both large and small types, British Landing Gears have designed and are making a unit which has several distinct advantages. B.L.G. will be remembered as the company behind a particular development of the tricycle undercarriage, in which the third wheel is positioned behind the two main wheels. Experiments and test work are still going on with this type of undercarriage, but in the meantime B.L.G. have designed the special tail-wheel unit.

Its principles are very simple indeed. In the first place the oleo leg is separate from the wheel unit itself, so that there are no side loads in the movement. In the second place, the wheel is centred not by a spring, but by a cam arrangement. The oleo leg is above the unit and is operated through a link or directly through a joint according to the particular design, and the cam arrangement has the advantage that its self-centring action depends entirely on the actual loads applied.

The prototype tail-wheel unit has been fitted to the old Sports Avian used by Mr. Eugster for the original demonstrations of the Cowey tricycle, and Mr. Cowey is, incidentally, the designer of the new tail wheel. When we tried the machine at Heston, there was quite a strong wind blowing, and yet, without using the rudder or the wheel brakes, the Avian would taxi across wind almost in a straight line. There was a very slight tendency for the machine to swing into wind, but the radius of the turn was a matter of a couple of hundred yards. When taxying either up-wind or down-wind there was absolutely no divergence from the straight, though we motored the Avian over some of the very much less smooth patches at the eastern end of the aerodrome.

For normal purposes the swivelling section of the tail wheel would, within the resisting limits of the cam gear, be quite free, but in the Avian the wheel is interconnected with the rudder in order to give more immediate small-space manœuvrability than is available with the help of rudder and slipstream only. There was absolutely no hesitation in the turning movement, and once the feet were taken off the rudder pedals the machine carried on its new course without continuing the swing. It was obvious, therefore, that the cam was doing its work. Even when the feet were taken off with the rudder pedals fully over in one direction or the other, the Avian straightened out almost at once.

This particular tail wheel was designed originally for Service types, but the company intends to put on the market a unit suitable for light aeroplanes, and these will carry, in the case of privately owned machines, a guarantee of two years against any form of mechanical trouble, and, in the case of club or school machines, a guarantee of one year. A batch of wheel units suitable for B.A. Swallows is now in production in the British Landing Gear works at Milner Square, London, W.1.

LANCASHIRE ANNUAL

SUCCESSFUL garden parties must necessarily be blessed with good weather, and the Lancashire Club's annual show at Woodford on July 1, certainly received that blessing—deserved after the last year's downpours.

The morning event was a landing competition for C.A.G.s in a 25 m.p.h. N.W. wind and below a six-tenths ceiling. Shortly after noon, however, the sky cleared, and before sundown conditions were perfect. Guests appeared at three distinct periods: those with aircraft from about 12.00 to 14.00, and motorists from 13.00 to 15.00, followed by an evening tide from 21.00 to 22.00. The organisers pronounced the event as entirely successful, with an estimated attendance of 1,200 to 1,500 people. Visitor's machines numbered well over a score, and early arrivals included Messrs. G. N. Wikner and Norman Edgar in a Wicko, Hollis Williams with the prototype tricycle Cygnet, and Peter de Havilland with a Moth Minor. Other official or semi-official arrivals were those of A. W. H. Dalrymple with a Chilton, W. H. Moss, from Chorley, with a Mosscroft and Eric Ward with a two-seater Tipsy.

The C.A.G. landing competition was judged on landing and approach style as well as distance from a mark. It was followed by a sealed time-arrival event from 12.30 to 13.00 hours, which was won by Mr. Hollis Williams. Incidentally, this arrival time coincided with lunch-hour interval for scores of aircraft workers. The C.A.G. inter-unit landing competition, which followed, resulted in a win for Leicester with a Moth Minor; Witney and Oxford were second.

Shortly after 15.00 hours Major Alan Goodfellow arrived in a Tipsy to inspect the Woodford A.D.C. Corps. Meanwhile spectators enjoyed some aerobatics by three Miles Magisters. They approached in formation at 3,000-4,000 feet, broke off in slow succession, and gave an entertaining show of slow rolls, rolls off the top and just loops. Mr. P. de Havilland, in the new Minor, exhibited its general performance and milder aerobatic qualities. A Service member of the Club (Sqn-Ldr. R. T. Gething, we believe) gave the finest individual aerobatic show with a Cadet. Another member, Mr. A. W. Vincent, demonstrated Mr. A. E. Thomas' Percival Vega Gull. Twenty-three visiting pilots entered a flour-bag bombing competition, the winner being Mr. Dawson, who was fourteen yards off the mark with his farinaceous missile. This was immediately followed by a height-judging competition, when Mr. P. H. Meads, in an Avro Cadet, made eights at a predetermined height. Two entertaining demonstrations were those by Mr. Wikner with the fully aerobatic Wicko including some particularly slow rolls below 1 000 feet and by Mr. Hollis Williams with the Cygnet in his usual style. In the end, the much-demonstrated Cygnet was very mildly and temporarily broken about the undercarriage.

After tea a Western Airways 86 was brought over from Ringway by Mr. L. F. Buchan, to provide pleasure flights, and the same machine co-operated with the 39th Batt. R.E. A.A. (T.A.) in a searchlight and sound locator demonstration from dusk.

By way of a change from last year's, the weather for the Lancashire Aero Club's garden party was fair to good—with, as can be seen no reason for clubhouse congregation.

"Flight" photograph

The mock-up is one of the most realistic and complete we have ever seen.

PREPARING for the F.C.I.

Detailed Planning in the Fairey Works : Sub-dividing a Crew's Duties

A VERY good idea of what can be done by intelligent anticipation and by working with the help and advice of airline people is obtained by an examination of the completed mock-up of the new Fairey F.C.I. transport, fourteen of which have been ordered by the Air Ministry. Since the order was first placed the company has been working in collaboration with British Airways' operational department in particular, and the result is a layout which, from the point of view of the crew, must be very nearly ideal. In spite of the fact that very little space has been wasted, there is ample room.

In planning the control cabin the main object has been to divide the crew's duties so that the pilot and co-pilot are relieved of incidental work and yet at the same time to arrange the accommodation so that the pilots, the engineer and the radio operator can be in personal communication with one another.

Briefly the layout of the cabin, seen in plan form, is such that the engineer is immediately behind the first pilot and the radio operator immediately behind the second pilot. The flying and basic engine controls and instruments are looked after by the pilots, while the engineer's own control panel and the radio equipment are mounted on the rear bulkhead. The engineer and radio operator, therefore, have their backs to the pilots, but have only to lean back a few inches to be in direct conversation. The control cabin is, in any case, soundproofed and "pressurised" with the rest of the machine, so that there should be no need for raised voices

Dealing first with the dashboard and control layout, everything is very conveniently arranged, and the only roof-mounted controls are those for the ignition systems of the four engines Since there is a special instrument panel for the engineer, the only instruments to be watched by the two pilots are those for r.p.m. and boost. These are arranged in a centre panel at the top of the dashboard. Below this is the panel for the Sperry automatic pilot, and on each side are duplicated blind-flying layouts—including, on the first pilot's side, homing and blind-approach indicators. There are no control columns in the ordinary sense of the word, the aileron wheel columns passing through the dashboard in the same way as those of the Stinson Reliant; the space in front of the pilots' seats is, therefore, free from obstruction.

All the engine and trimming controls are conveniently arranged in a bank (tee-shaped in plan form) below the dashboard and between the two seats. The undercarriage control lever protrudes from the dashboard on the first pilot's side, though it can easily be reached by the second pilot. This is a simple up-and-down lever which normally remains in a central fork, this also acting as a stop. In case of hydraulic failure, there will, of course, be an auxiliary mechanical gear and it is worth knowing that very little effort will be required in the operation of this, since the main undercarriage drops automatically when the pressure is released, and the only work involved will be that of locking it home and of getting the forward leg of the tricycle arrangement fully down.

In the control bank, the trimming wheels are mounted so that the operation is quite natural according to the axis concerned. The fore and aft trim is adjusted by means of two small wheels on each side of the bank, the rudder bias by means of another wheel which has a vertical axis, and the aileron tabs by a third with a fore and aft axis. The throttles are in gates on the left side of the top of the "T," with the C.S. airscrew controls on the right, and the mixture controls behind them in the centre. On the left side of the throttles is another lever controlling the flaps or auxiliary wing (which has already been described in *Flight*), and on the right side of the airscrew controls is the automatic pilot cut-out lever. On the first pilot's left side is the control panel for the blind-approach equipment, as well as a telescopic drift sight.

The engineer's panel carries the r.p.m indicators, the boost gauges, the mixture analysers, and oil and engine temperature gauges. He also looks after the oil radiator, the engine cooling shutters, the cabin heating control and the fuel system. While the pilot has the master engine controls, his engineer makes the necessary fine adjustment to all these according to the readings of the revolution counters, manifold pressure gauges and mixture analyser needles. The main fuel indications are provided by flow-meters so that he can lean down the mixture as and when necessary if one or other engine appears to be using too much—while, of course, watching the cylinder head temperatures concerned.

Radio Reserves

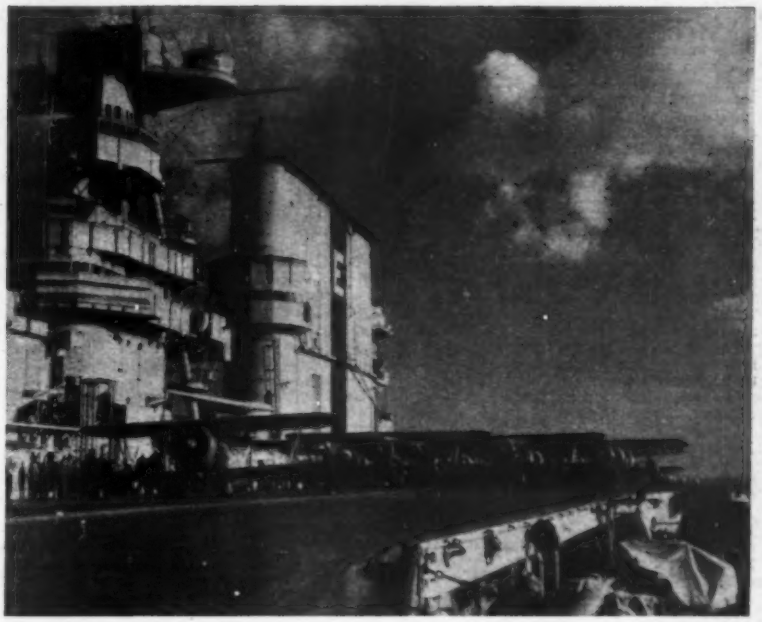
All the Marconi radio equipment will be carried in panels in the rear bulkhead, and in the finished machine there should be no sign of that somewhat disturbing appearance of advanced electrical engineering which is still common in so many machines. Above the main equipment are the Lorenz receiver units, and a section of the main panel consists of a spare valves container. Beneath the operator's desk is another panel carrying complete spare transmitters and receivers, so that if there was any failure in the service equipment it is only necessary to pull out the offending section and replace it with one of the spare "frames." The mere act of pushing the replacements home makes the necessary connections.

It seems to be possible that it may eventually be necessary to arrange a form of pressure "lock" in the entry between the steward's galley and the control cabin, so that while the passenger compartment is under pressure at flying altitude, the control cabin is at outside pressure—the crew using oxygen when and if necessary. Although, in theory, it is a good thing that the crew shall be working in normal atmospheric conditions, considerable difficulties are likely to be experienced in organising the controls and instruments to keep this part of the machine quite airtight. It is interesting to know that something like 60 h.p. is necessary to hold the pressure at 16,000ft.

Particularly with the level-landing type of undercarriage, the view from the pilots' seats should be extremely good. Though the windows are not particularly deep, they are in the right position in relation to the eyes, and for bad-weather approach work both the side windows can be slid back; deflectors have been designed to ensure a draughtless view in this case.

SERVICE AVIATION

Royal Air Force and Official Announcements : Fleet Air Arm News : Military Aviation Abroad



U.S. CARRIER : A sunny but impressive scene on the flying deck of the U.S.S. *Saratoga*

Air Aide-de-Camp to the King

THE appointment of Group Capt. Donald Fasken Stevenson, D.S.O., O.B.E., M.C., as Air Aide-de-Camp to His Majesty the King is announced. Group Capt. Stevenson succeeds Group Capt. Franks Lubbock Robinson, D.S.O., M.C., D.F.C., who relinquished the appointment on his retirement on May 1.

Group Capt. D. Stevenson, born in 1895, joined the R.F.C. as Flying Officer in 1916, being appointed Flight Commander in the following year. He served in France during the greater part of 1916-1918, and held the command of various squadrons. For his services he was awarded in 1917 the Military Cross for conspicuous gallantry and a Bar to the Military Cross, and a year later the Distinguished Service Order. He was mentioned in despatches in 1918-1919. He received the O.B.E. (Mil.) in 1937.

In 1919 he was granted a permanent commission in the Royal Air Force, was promoted Squadron Leader in 1925, Wing Commander in 1933 and Group Captain in 1938. He was employed on staff duties at Headquarters, Inland Area, and Headquarters, Iraq, in 1924, and commanded No. 6 (A.C.) Squadron in 1925. In 1931 he was appointed to the command of No. 12 (Bomber) Squadron, and two years later was appointed Senior Air Staff Officer at R.A.F. Headquarters, Palestine and Transjordan. Since January, 1938, he has been Deputy Director of Operations (Home) at the Air Ministry.

New R.A.F.V.R. Aerodromes

TO provide additional facilities for training R.A.F.V.R. personnel, a number of sites suitable for aerodromes have been considered by the Air Ministry. One of these is the Marlow site, which it is intended to develop as a civil aerodrome. This has been investigated by the local authorities and the Town-Planning Committee is satisfied that it is the most suitable in the area. The Air Ministry has approved it as suitable for the R.A.F.V.R. training. The proposed centre, in the town of Marlow, will have a training capacity of 200 pilots and 200 members of air crews.

Other sites in the Home Counties are being considered but it is rarely possible to avoid a certain amount of inconvenience to individuals, especially in the area around London.

£10,000 for Sports

THE Air Ministry announces that Lord Rothermere, who was the first Secretary of State for Air when the Air Ministry was created in 1918, has made a gift of £10,000 for the general benefit of Royal Air Force sports, with particular reference to inter-unit competitions.

New Staff College

A PROVISIONAL sum of £300,000 was included in the last Air Estimates for the construction of a new R.A.F. Staff College. Ramridge House, Weyhill, near Andover, has been acquired as the site, and to commemorate the event a Garden Party is to be held on July 15 in the grounds of the house, when the Chief of the Air Staff will receive the title deeds from the previous owner.

Polish Officers at C.F.S.

THE undermentioned officers of the Polish Air Force are attached to the Central Flying School as from July 3:—Lt. Col. Pilot J. Bajan; Capt. Pilot B. Orlinski; Capt. Pilot A. Wodarkiewicz; Engineer Pilot Roland Kalpas.

F/O. Dawee Chulladrapya, of the Siamese Air Force, will be attached to a Bomber Squadron as from July 3.

Capitaine Duhazé, of the French Air Force, will be attached to the School of Air Navigation as from July 3, 1939.

Director of Works

THE Secretary of State for Air has appointed Mr. E. Holloway, O.B.E., M.Inst.C.E., M.Inst.M. and Cty. E., to be Director of Works, Air Ministry, with effect from July 7, in succession to Colonel J. F. Turner, C.B., D.S.O.

Mr. Holloway was educated at the King Edward VI Grammar School, Birmingham. After professional training he entered the local Government Service. He enlisted in 1915 and was commissioned in the Royal Flying Corps in 1916, attaining the rank of Major, and for War Service was awarded the O.B.E. (Military). On demobilisation in 1920 Mr. Holloway was appointed a Civil Engineer in the Directorate of Works of the Air Ministry, and after serving in various posts at home and abroad, including Chief Engineer in the Coastal Command, Air Defence of Great Britain, and Middle East, he was appointed Assistant Director of Works in 1934 and Deputy Director of Works in 1937.

Royal Air Force Gazette

Royal Air Force

General Duties Branch

W. E. Williamson is granted a short-service commission as Flying Officer on probation in the supplementary list (June 10).

The following Acting Pilot Officers on probation are confirmed in their appointments and graded as Pilot Officers on the dates stated:—

April 5

J. R. S. Gordon, J. C. Wilson.

May 13

J. H. Frampton, A. W. R. Perry, M. Ravenhill, B. N. Whittle.

June 27

C. C. Allington, S. G. Baggott, A. Bailey, A. S. Ballingall, E. T. Banks, N. L. Banks, H. M. F. Barnitt, R. J. Bennett, J. H. S. Bidwell, C. G. Birch, L. T. Bryant-Fenn, F. R. Bullot, C. C. Cameron, H. P. Cochrane, F. G. Collins, J. M. Davies, J. S. Dinsdale, K. C. V. D. Dundas, P. S. B. Ensor, H. E. L. Falkus, P. W. de B. Forsyth, R. H. Franklin, C. R. French, A. A. Gawith, R. T. Gerry, N. A. Gidney, P. O. V. Green, P. J. B. Griffiths, R. J. Hardiman, F. C. B. Harrison, M. N. Hesketh, R. A. Hilton-Barber, M. D. S. Hood, L. G. Hunt, B. J. Hyde, L. J. Joel, J. R. H. Lascelles, K. A. H. Lawrence, A. F. Lemaistre, D. E. H. Levin-Raw, J. M. Lewis, K. Linton, R. B. Lord, R. G. Lynn, J. G. Mackid, H. J. D. Matson, E. M. Metcalfe, S. J. Millen, D. W. W. Morris, J. D. Morrison, H. M. Murray, J. H. Nicholson, J. T. O'Brien, E. G. L. Pelling, P. B. Pickersgill, N. W. Pinnington, J. F. S. P. Price, A. S. W. Prioleau, C. De W. Richardson, A. G. Rigg, W. W. T. Ritchie, D. J. Rose, R. M. Ross, A. W. Smith, G. B. Smyth, A. J. D. Snow, W. Stapleton, R. W. Sutherland, J. F. Swift, P. D. C. Thomas, T. A. Trotter, D. D. Weightman, J. N. Whitney, E. A. Wickenkamp, D. A. Willans, P. F. Willing,

Service Aviation

E. J. Woods, V. C. Woodward, J. R. Wyllie, J. C. Young.

Wing Cdr. E. B. Grenfell, A.F.C., is promoted to the rank of Group Captain (July 1).

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—W. E. Casey (April 28) (seniority March 14); E. Banthorpe, C. H. Press, R. K. Jeffries, J. A. Chorlton, J. C. Mayhew (Acting Flight Lieutenant), J. N. Dowland, D. McIntyre (June 14).

The following Pilot Officers are promoted to the rank of Flying Officer on the dates stated:—H. G. F. Gaubert (May 16); J. R. Cree (June 12); T. A. Darling, J. R. Grice, H. A. Oliver, C. F. L. Tulloch, M. R. Atkinson, R. C. Beaman, H. O. Thwaite, F. L. H. Eddison, N. K. Loyd, C. P. Wright (June 16); D. C. Maybury, T. I. Mathewson, L. M. Moore, J. C. Breese, M. L. Watson, R. M. Burns, D. E. Gould, A. Chalmers (June 18); J. C. Milner, J. Adams (June 21).

The following Flying Officers are granted the acting rank of Flight Lieutenant on the dates stated:—H. D. Cooke (February 4); R. G. Taylor, W. M. Penman, T. E. Shrapnell-Smith, D. G. Tomlinson (March 2); E. J. C. Michelmore, J. H. White, H. Stringer (April 3); J. C. G. MacNab (April 22); A. W. T. Traill (April 29); H. G. Mossford (May 5); G. V. Smither (May 8); F. F. Rainsford (May 12); F. J. Kelly (May 13); J. B. Stewart (May 15); A. J. Goldie (May 16); R. A. Milward (May 17); J. B. Flowerdew (May 21); W. M. Penman, S. H. Cruise (May 22); R. G. Ker-Ramsay (May 23); R. H. Dingle (May 25); L. C. Withall (May 31).

The following Flying Officers relinquish the acting rank of Flight Lieutenant on the dates stated:—E. J. C. Michelmore (February 4); F. R. Foster (March 24); W. M. Penman (April 16); K. H. Savage (May 16); J. A. Crockett (June 1); R. E. Mills (June 10); A. A. N. Breckon (June 16).

The notification in the *Gazette* of May 19 concerning F/O. L. L. Johnston is cancelled.

The following Squadron Leaders (R.A.F. Ret.) are granted the honorary rank of Wing Commander (May 11):—H. A. Michell, O.B.E., C. B. Riddle.

Flt. Lt. (Honorary Sqn. Ldr.) F. J. B. Powell, M.B.E. (R.A.F. Ret.), is granted the honorary rank of Wing Commander (May 11); Group Capt. H. J. F. Hunter, M.C., is placed on the retired list at his own request (June 15); Group Capt. L. C. Keeble is placed on the retired list on account of ill-health (July 1); Sqn. Ldr. R. C. Keary is placed on the retired list on account of ill-health (June 2); Sqn. Ldr. T. J. E. Thornton is placed on the retired list on account of ill-health (May 15). (Substituted for notification in *Gazette* of June 9, 1939); Flt. Lt. G. R. Canavan is placed on the retired list on account of ill-health (July 30); P/O. R. R. McQueen resigns his short-service commission (June 28).

Accountant Branch

W/O. A. P. Scardifield is granted a commission as Flying Officer on probation with effect from June 26, 1939, and with seniority of March 27, 1939.

Commissioned Engineer Officers

The following Warrant Officers are granted commissions as Flying Officers on probation with effect from the dates stated and with seniority of June 12, 1939:—

J. R. Stone (June 12).

W. Steele, A. Matthews, A. F. Cave, J. A. Bennett, F. P. Cotterell (June 19); A. G. Evenden, H. Cadman, C. J. F. McRae, T. E. Leicester, E. H. J. Martin (June 23).

Commissioned Signals Officers

The following Warrant Officers are granted commissions as Flying Officers on probation with effect from the dates stated and with seniority of June 12, 1939:—

L. T. Card (June 12).

C. T. Burridge, A. W. Alberry, J. Thom, L. R. Ridley (June 19).

June 23

K. Roberts, C. D. Connerton, P. H. Wood, H. G. H. Copeland, F. E. Groom, T. A. Scarff, W. Tomlinson, A. R. Pearce, W. G. Lawrence, W. K. Richards, J. Edwards.

Commissioned Armament Officers

The following Warrant Officers are granted commissions as Flying Officers on probation with effect from the dates stated and with seniority of June 19:—

June 23

J. Raeside, H. G. G. Matthews, H. Wright, E. F. Price, R. W. Ackerman, E. H. White, H. Lyons, L. R. Robinson.

Royal Air Force Reserve

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

Lt. Col. H. G. C. Laird, D.S.O. (I.A. Ret.) is granted a commission in Class CC as Wing Commander (April 17).

The following are appointed to commissions in Class CC as Flight Lieutenants with effect from the dates stated and are granted the hon. rank of Squadron Leader with effect from April 1:—

December 1, 1938.—Lt. R. C. T. Spier (R.A.R.O.). March 13.—Lt. Col. F. J. W. Firth (I.A. Ret.). March 26.—Lt. Col. P. V. Davidson, D.S.O (R.A.R.O.) Lt. T. C. Hobbs, M.C.

The following are granted commissions in Class CC as Flight Lieutenants (Hon. Squadron Leaders) on the dates stated:—

April 3.—Lt. M. H. Fitzgerald (R.A.R.O.) April 13.—Capt. R. W. Brierley. May 13.—Maj. G. D. Hill (R.A.R.O.).

The following are granted commissions in Class CC as Flight Lieutenants on the dates stated:—

October 19, 1938.—Capt. T. G. Jefferies, D.F.C. May 10, 1939.—Sec. Lt. T. M. Hodgson. May 14.—Capt. H. M. Ferreira. May 16. Sec. Lt. H. P. N. Gubbins

The following are granted commissions in Class CC as Flying Officers (Honorary Flight Lieutenants) on the dates stated:—

March 14.—Flt. Lt. G. Burdick (R.A.F.O.). May 9.—Capt. L. R. Rochford, D.S.C., D.F.C.

G. W. E. Baker is granted a commission in Class CC as Flying Officer (May 22); F/O. J. K. Lawrence relinquishes his commission on appointment to a commission in the Royal Air Force Volunteer Reserve (February 5); F/O. J. V. Holman relinquishes his commission on completion of service and is permitted to retain his rank (May 1); F/O. J. A. Gillies relinquishes his commission on appointment to a commission in the Auxiliary Air Force (July 4).

Equipment Branch

Flt. Lt. N. S. Roupell relinquishes his commission on completion of service (April 24).

Royal Air Force Volunteer Reserve

General Duties Branch

J. K. Lawrence is granted a commission as Flying Officer with effect from February 5, 1939, and with seniority of December 25, 1931.

The following are granted commissions as Pilot Officers on the dates stated:—

June 21.—A. N. C. Weir. June 23.—H. C. Black, E. E. Barber, C. M. Henderson. June 24.—N. B. Dyke, I. D. H. Gibbins. July 4.—E. G. Hughes.

P/O. W. R. Ross relinquishes his commission on appointment to a commission in the Auxiliary Air Force (July 4).

Administrative and Special Duties Branch

Pilot Officer on probation P. D. Abbott resigns his commission (April 6).

Equipment Branch

Acting P/O. E. B. Wilson is employed with the Royal Air Force (June 21).

Auxiliary Air Force

General Duties Branch

No. 501 (COUNTY OF GLOUCESTER) SQUADRON.—The following are granted commissions as Acting Pilot Officers (June 12):—J. W. Bland, A. C. James.

No. 504 (COUNTY OF NOTTINGHAM) SQUADRON.—P/O. A. H. Rook is promoted to the rank of Flying Officer (December 23, 1938).

No. 601 (COUNTY OF LONDON) SQUADRON.—F/O. H. S. Cavendish is promoted to the rank of Flight Lieutenant (January 28).

No. 603 (CITY OF EDINBURGH) SQUADRON.—W. A. Douglas is granted a commission as Acting Pilot Officer (June 11).

No. 604 (COUNTY OF MIDDLESEX) SQUADRON.—The following are granted commissions in the ranks stated (July 4):—*Flying Officer.*—J. A. Gillies. *Acting Pilot Officer.*—W. R. Ross.

P/O. H. P. Oldham relinquishes his commission (January 13).

No. 615 (COUNTY OF SURREY) SQUADRON.—J. C. M. Hanbury is granted a commission as Acting Pilot Officer (June 7).

No. 616 (SOUTH YORKSHIRE) SQUADRON.—R. Roberts is granted a commission as Acting Pilot Officer (May 15).

No. 902 (COUNTY OF LONDON) SQUADRON.—The following are granted commissions in the ranks and on the dates stated:—*Pilot Officers.*—C. W. Botham, H. J. Underhill (June 5). *Acting Pilot Officer.*—W. F. Danton (June 5).

No. 903 (COUNTY OF LONDON) SQUADRON.—The following are granted commissions as Acting Pilot Officers on the dates stated:—L. H. Farbrother, V. C. Humfrey (June 7).

No. 904 (COUNTY OF SURREY) SQUADRON.—H. R. G. Colclough is granted a commission as Pilot Officer (June 6).

No. 906 (COUNTY OF MIDDLESEX) SQUADRON.—R. H. James is granted a commission as Acting Pilot Officer (June 5).

No. 909 (COUNTY OF ESSEX) SQUADRON.—G. A. Mitchell is granted a commission as Pilot Officer (May 26).

No. 910 (COUNTY OF ESSEX) SQUADRON.—Acting P/O. A. G. Barr relinquishes his commission (May 6).

No. 913 (COUNTY OF WARWICK) SQUADRON.—E. S. Rickards is granted a commission as Acting Pilot Officer (April 28).

No. 919 (WEST LANCASHIRE) SQUADRON.—The following are granted commissions in the ranks and on the dates stated:—*Flight Lieutenant.*—Capt. E. J. Richmond (May 15). *Pilot Officer.*—J. C. A. Reid (May 19). *Acting Pilot Officer.*—M. S. Brown (June 9).

No. 921 (WEST LANCASHIRE) SQUADRON.—The following are granted commissions in the ranks and on the dates stated:—*Pilot Officer.*—J. C. Fitzgeorge Parker (May 22). *Acting Pilot Officer.*—G. D. Wall (June 8).

No. 931 (COUNTY OF DEVON) SQUADRON.—E. Garland is granted a commission as Acting Pilot Officer (June 6).

No. 936 (COUNTY OF NORTHUMBERLAND) SQUADRON.—T. Sample is granted a commission as Flying Officer (April 16).

No. 943 (EAST RIDING) SQUADRON.—J. McLaren is granted a commission as Squadron Leader and appointed to the command of the Squadron (February 27).

No. 945 (CITY OF GLASGOW) SQUADRON.—J. K. Rodger is granted a commission as Pilot Officer (April 17).

No. 946 (CITY OF GLASGOW) SQUADRON.—Flt. Lt. A. S. Jackson is promoted to the rank of Squadron Leader and appointed to command the Squadron (June 12).

Medical Branch

No. 910 (COUNTY OF ESSEX) SQUADRON.—F/O. H. Barlow, L.R.C.S., L.R.C.P., relinquishes his commission (May 30).

No. 932 (HAMPSHIRE) SQUADRON.—Major H. E. Suter, M.R.C.S., L.R.C.P., is granted a commission as Flight Lieutenant (May 17).

No. 942 (EAST RIDING) SQUADRON.—A. M. Boyne, L.R.C.P., L.R.C.S., L.R.F.P.S., is granted a commission as Flying Officer (March 3).

TWO IN ONE: Twin-engine reliability with a single-engine layout is offered by the new Vega monoplane, which has the Unitwin engine, consisting of two in-line Menascos lying side by side and clutched to a single constant-speed airscrew. Take-off power of 590 h.p. is available at the shaft.

FROM the CLUBS and SCHOOLS

EXETER.
DESPITE three days of high wind, 107 hr. were flown the week ended July 3. On June 29 Mr. A. H. Phillips inspected the local C.A.G. unit. A new Tiger Moth was delivered on June 28.

MARSHALLS'.
Over 75 hr were recorded during the week ended July 8. The club's new Moth Minor was delivered last week.

DONCASTER.
During the fortnight ended July 8, 102 hr. 3 min. were flown. Messrs. Rothwell, Wagstaff and Turner have gone solo.

PORTSMOUTH.
Club and C.A.G. members logged 52 hr. during the week ended July 8. Sixty-one members of the C.A.G. are now flying solo.

LINCOLNSHIRE
Over 94 hr. flying time were recorded last week. Miss D. Grant and Mr. K. A. Warren have gone solo. The new clubhouse has now been opened.

THANET.
High winds reduced flying time for the week ended July 3 to 139 hr. H. L. Thompson went solo. On June 24 Capt. Harold H. Balfour inspected the C.A.G. section.

PLYMOUTH
Flying time for the week ended July 3 amounted to 75 hr. Mr. A. H. Phillips examined the C.A.G. on June 28 in connection with the Londonderry Shield.

SOUTH COAST.
High winds and general bad weather greatly reduced flying last week. A "dawn patrol" will be held on Sunday, August 6, to which all flying clubs are invited.

BEDFORD
Unfavourable flying conditions have reduced flying time this week. Mr. A. V. Huckle has gone solo. Several cross-country flights have been made to Hatfield.

LONDON
Last week's flying time totalled 152 h. 30 min. Mr. R. E. D. Cayley went solo, while Messrs. A. W. V. Green, V. Covington and I. S. Warbey have joined as new members.

YAPTON.
Over 36 hr. were recorded by club and C.A.G. members during the last week. There are 76 Civil Air Guards now under instruction. Thirty-three members are now flying solo.

WESTON.
Bad weather reduced flying time for the week ended July 3 to 51 hr. Nearly 500 people attended a C.A.G. dance on June 30. Mr. A. H. Phillips inspected the C.A.G. unit.

HANWORTH.
Over 122 hr. were recorded by members of the club and its C.A.G. section. Mrs. E. Ratcliff-Chamier has gone solo. A garden party will be held in the grounds on August 6, 1939.

WEST SUFFOLK.
Total flying time for last week amounted to 20 hr. Miss E. Kirk and L. E. Peveritt have joined the C.A.G., and H. S. Foulds and E. Cornish have joined the club as new members.

HERTS AND ESSEX.
Flying time for June was 377 hr. 35 min. During the fortnight ended July 6, 172 hr. were recorded. First solo flights were made by Messrs. C. W. Lawson, S. J. Millar, T. L. Favret, A. L. Judge and F. A. Black. Capt. Harold H. Balfour inspected the C.A.G. unit on July 1 Mr. S. H. Parker has obtained his instructor's endorsement.

HORTON KIRBY.
A total of 171 hr. 25 min. was recorded last week. Messrs. M. Corrie, G. A. Dimond and A. Enticknap have gone solo. Another D.H.60 has been obtained for training purposes.

IPSWICH.
During the week ended July 3, 89 hr. were recorded. On July 1 Sir Lindsay Everard, Commissioner of the C.A.G., inspected the local C.A.G. in connection with the Londonderry Shield.

BROOKLANDS
Flying time for last week amounted to 112 hr. Mr. Bilgrami has successfully completed his "B" licence tests, while Mr. D. Holdsworth has obtained his Second Class Navigator's Licence.

YORKSHIRE.
Flying time for the month ended June 30 totalled 758 hr. 10 min. A Puss Moth and a Leopard Moth have been hired in order to cope with the increased co-operation flying. On June 25 Major Goodfellow inspected units of the C.A.G.

LONDON TRANSPORT.
One hundred and sixty hours were recorded during the month of June. Messrs. Pithouse, Bayless and Gardener have gone solo. Capt. Balfour and Capt. Barrow visited the club. Three machines took part in the Redhill "dawn patrol."

NORFOLK AND NORWICH.
A new Moth Minor has been delivered to the club for the instruction of the C.A.G. pupils. Capt. W. A. Ramsay took the Hornet Moth to Elmdon this week-end to attend the official opening. Sir Lindsay Everard inspected the C.A.G. unit.

ISLE OF WIGHT.
Flying time for the week ended July 3 amounted to 78 hr. 30 min. E. A. Sibbick and G. Butler have gone solo. On Friday next an Air Display will be held in aid of the local hospitals. All pilots will be welcomed provided they land not later than 2.30 p.m.

CINQUE PORTS.
Flying time for the week ended July 9 amounted to 47 hr. The waiting list is now reopened for fresh applicants wishing to undergo training for the C.A.G. On Sunday, Mr. Eric Symmons flew to Brussels in one of the club's Tiger Moths with a passenger. Mr. Beacon and Mr. Robinson have joined as new members.

BRISTOL AND WESSEX.
Flying time for June amounted to 224 hr. 45 min. Messrs. C. D. M. Stewart, J. Moira and E. A. Thompson have gone solo. Messrs. N. J. Durrant, G. C. Chick, L. J. Corbett, L. W. Cordey, C. H. D Curtoys and Flt. Lt. H. J. Irens have joined the club. The new Moth Minor has been delivered. The Avro Cadet is also in action again.

Overseas

BENGAL.
More than 114 hr. were logged in the club's aircraft last May. Messrs. S. S. Mohapatra, R. Chavan and S. Sinoff have gone solo. Visitors to the club during the month included Frau Elly Rosemayer and M. Gilbert Dennis.

The Gosport Reunion

ARRANGEMENTS for the Gosport reunion dinner on Saturday, July 22, at Brooklands, have now been completed. Col. Smith-Barry will take the chair while Captain H. H. Balfour, M.P., Parliamentary Under Secretary of State for Air, has promised to attend, together with a number of old Gosport instructors and pupils. Tickets, at 5s. each, are limited to 60 and are available from Captain Duncan Davis, Brooklands Flying Club, Weybridge, Surrey.

COMMERCIAL AVIATION

GOOD COMMUNICATIONS: Two very ordinary Junkers Ju.52s—but interesting because they are two of the Eurasia Aviation Corporation's five, and are on the aerodrome at Sianfu, China. The company also used one Junkers W.33 and two W.34s. Until a few months ago the Eurasia operating base was at Chungking, but with the advancing war their base has now been transferred to Kunming, which was previously known as Yunnanfu. The most recent extension of the Eurasian network has been to Hami, near the U.S.S.R. border

THE WEEK AT CROYDON

"A. Viator" Discusses New Airline Equipment, Customs Retribution, Bricks, Travel Comfort and Catering

PEERING forth from my Window in Thrums I realise that the Sabena has quite a mixed fleet. Yesterday I saw the registration OO- on a Junkers Ju.52, on a Savoia-Marchetti and on a Douglas D.C.3. I seem to remember, too, tri-motor Fokkers bringing in bullion for Sabena not very long ago, and at one time the Belgian firm used Handley Pages.

An amusing incident happened recently, when seven enormous gentlemen of the 16-18-stone category were due to leave, by special charter, I believe, for Le Touquet. So heavy were they and so much did their luggage weigh that the Company was in the quandary of discovering that the machine would be overloaded. So the seven jolly gentlemen abandoned most of their kit and strolled to the machine with essentials only under their arms, including very bright pyjamas and dressing gowns which fluttered in the breeze. I hope they had the time of a lifetime over there.

I hear that Irish Sea Airways, whose pilots, incidentally, have adopted the Continental habit of wearing a gold "chinstrap" on their caps, instead of a patent leather one (and very much smarter, too, to my way of thinking), are already in possession of the first of their Lockheed 14s. Rumour has it that Olley Air Service (or West Coast Air Services), who operate in pool with I.S.A. (or Aer Lingus Teoranta) are to use D.H. Flamingos as opposite numbers to the Lockheeds.

Retribution overtook H.M. Customs and Excise the other day, after the way in which they oppressed the flying foxes, and called them birds and all that. Somebody sent a live electric eel from Hamburg with a warning that, air travel being so healthy, the creature would be full of beans on arrival and that these beans would give out sparks inches long. Everybody was awfully polite to the eel and did not dream of calling it a quadruped or anything, in spite of the eel's well-known habit of going on the razzle at night across country and returning to its native pond with the milk.

The week before last I had a few words to say about a North of England newspaper which accused British Airways of running a flying-boat service from Croydon to Brussels. Somebody from the verge of the Arctic Circle ("Canny Newcassel" to quote Mr. James Pigg), wrote to the Editor to point out that North of England newspapers were not the only ones to drop phenomenal bricks. He pointed out that in the same issue of *Flight* it was solemnly announced that a new aerodrome is to be laid out near Tokyo by the municipality, with an area of something like one and a half million miles. This figure was so manifestly impossible, however, that nobody could conceivably have believed it. The remarks in the North Country newspaper were, I suppose, an article of faith with the scribe, who, having seen an Empire boat fly over some inland airport on a display day, was firmly convinced that boats landed at Croydon pretty regularly.

I have been fortunate enough to travel around quite a lot lately by air, and one of my trips was by K.L.M. D.C.3 from Amsterdam to Grangemouth, Central Scotland Airport, for the opening ceremony. From there we flew to Prestwick and thence, next day, to Elmdon, the new Birmingham airport. Thence again we flew to Manchester, Ringway, and to Speke, airport of Liverpool, where I boarded a train for London.

You Want the Best . . .

A really remarkable contrast between air and surface travelling was in the matter of seating accommodation. Aviation and furniture experts have spent endless time and trouble in obtaining a chair which fits the human body and which is therefore comfortable for hours at a time. Maybe you don't notice it unless you have just travelled in a properly designed aeroplane chair, but it's a fact.

Although the glory of flying the Atlantic regularly alongside the Americans is not yet shared by the British company, I see that the catering arrangements on the return journey of the *Dixie Clipper* from Southampton were made by Imperial Airways. This, in any case, must be a record for the catering department of any British firm. The luncheon and dinner menus featured, according to a bulletin—(why "featured," I wonder, for surely a feature is a nose or a chin, though, of course, if it comes to catering there are cherry lips, peach complexions, mutton-chop whiskers and cauliflower ears), iced consummé, iced tea and salad together with grilled fillet mignon, roast turkey and cheese. Knowing what I do of Imperial Airways' catering I feel sure nobody suffered from dyspepsia on the homeward journey from this side across to the United States.

Colchester Again

SINCE the old Blue Barns site was finally closed a few years ago, Colchester has had no aerodrome. Recently, however, the Corporation has been looking into the matter again with the support and encouragement of the Straight Corporation. Not long ago the Colchester Airport Committee visited Ipswich to inspect the aerodrome and buildings there.

AGAINST the MERGER

A Considered Criticism of the Corporation from Group Captain Primrose : The Advantages of Healthy Rivalry

TOWARDS the end of last week Group Capt. Harold Primrose sent a letter to all Members of Parliament in connection with the British Overseas Airways Bill. In it he strongly criticised the Government's policy in forcing the merger of the two independent air transport companies. He considers that the merger is a thinly disguised form of nationalisation, and that the Secretary of State for Air has had the scheme forced on him by the Treasury against his better judgment. The Treasury was, in his opinion, obviously alarmed at the outlay possibilities where more than one company was concerned.

The result, in Group Capt. Primrose's view, is that we shall have again all the evils of the old Imperial Airways monopoly. It was only some time after the advent of British Airways as a second "chosen instrument" that the competition in operational methods and outlook had begun to show its curative effect. In America the policy has been to encourage competition, and only recently the Government there supported the establishment of a national rival, in American Export Air Lines, to Pan-American Airways.

The whole idea of a public corporation monopoly runs counter, says Group Capt. Primrose, to the publicly stated opinions of many of the very Ministers and officials who are now sponsoring it. For instance, the present Secretary of State for Air was responsible, when Postmaster General, for the policy of fostering another company, and the formation of British Airways, with the setting-up of the Fisher Committee, were largely the result of Post Office pressure. Again, the Cadman Committee definitely recommended that British Airways should be given various Continental routes, and said that it was in the interests of progress that there should be competition from another company. The present Under-Secretary, Capt. Balfour, was a director and shareholder in British Airways on its formation, and it must, therefore, be presumed that he approved of the formation of this company. Government support gave confidence to the private enterprise behind British Airways, on which a great deal of money was spent in development work.

Group Capt. Primrose considers that a simple solution to the whole problem would have been for the Government to have licensed each of the companies over separate routes; guaranteed a fixed interest on all further increase of capital; and paid a subsidy on every route operated by each company at an agreed rate per ton/mile of estimated capacity required. This subsidy might have been originally fixed on the estimated difference between the rate per ton/mile operating cost and the rate per ton/mile revenue, an adjustment being made annually when the difference between the operating cost and operating revenue had been ascertained from the actual operating results of the year. A small agreed percentage being retained by the company as an efficiency reward profit when the results showed a diminution of the required subsidy rate through a lowering of operational costs per ton/mile and/or an increase in operational revenue per ton/mile.

By such means the subsidy would, in his opinion, be limited to the minimum for services rendered; enterprise and efficiency would be encouraged; a stage of self-sufficiency reached at an early date; means provided for measuring relative operational efficiency; and a spirit of healthy rivalry retained as a necessary stimulus. It would, of course, have been left open to the companies to combine, of their own free will, certain of their interests where economic necessity suggested it.

A Canadian Loss

WE regret to learn of the death of Mr. J. A. Richardson, the President of Canadian Airways, on June 26. Fifteen years ago Mr. Richardson realised the importance of air transport in Canada, and organised, in 1926, Western Canada Airways, which later became Canadian Airways—and, apart from Imperial Airways, the largest air transport organisation in the British Empire.

West African Agreement

ON June 30 the existing agreement between the Air Ministry and Imperial Airways for the Khartoum-West African service expired. As might be expected, a new agreement provides for its continuance for a period of six months, subject to earlier termination if the new Corporation is established before the end of the year. The annual subsidy has been reduced from £47,000 to £44,000.

Incidentally, early last month the route was extended from Accra to Takoradi, which is the present terminal. As before, one return flight will be made every week.

Bad Weather Competition

THE Guild of Air Pilots and Navigators has for some time been seriously concerned with the fact that the foreign competitors of British airline companies have considerable advantage in the use of superior methods of ice protection, and considers that British pilots are asked, by comparison, to take unnecessary risks. The Guild not only recommends that every practical step should be immediately taken to ensure that, in future, no machines be put into service which are not adequately equipped for protection of the engines, airscrews, instruments and radio, but that every possible means of protection should be introduced on existing types. The Guild seeks to call public attention to this matter now, with a view to avoiding, next winter, a repetition of the difficulties experienced in previous winters.

Another Atlantic Week

THE Boeing 314, *Yankee Clipper*, with nineteen passengers on board, reached Southampton last Sunday evening after the first fare-paying passenger flight across the northern Atlantic route. The machine's time in the air between Port Washington and Hythe was 19 hr. 34 min., giving an average speed of approximately 165 m.p.h. The elapsed time was 27½ hours for the trip. Some 550 lb. of mail was carried and the crew of eleven was in charge of Capt. A. La Porte.

Cook Strait Airways

IN our guide to the world's air transport operators, which appeared in our issue of April 27, we gave the headquarters of Cook Strait Airways as at Wellington, New Zealand. For the benefit of the many who make use of this guide for reference purposes, it should be pointed out that Cook Strait Airways' address is, in fact, P.O. Box 85, Nelson.

Forthcoming Events

JULY.

Sat., 8th.-Sun., 16th. National Gliding Contests, Great Hucklow.
Sat., 8th-Sun., 23rd. Brussels Aero Show.
Sun., 16th-Sun., 23rd. Italian Aero Club: Littorio Rally, Rimini.
Sat., 22nd. Gosport Reunion, Brooklands.
Sat., 22nd-Tues., 25th Deauville and Plantagenet Air Rallies, France.
Tues., 25th. Alliance Française: Blériot Channel Flight 30th Anniversary Banquet, Dorchester Hotel, London.
Fri. 28th-Sun., 30th. Cannes Aero Club: Deauville-Vichy-Cannes Rally.
Sat., 29th. Civil Aviation Benevolent Fund Air Display, Redhill.
Sat., 29th-Sun., 30th. Frankfurt International Flying Meeting.

AUGUST.

Sat., 5th. Cinque Ports Flying Club: Folkestone Aero Trophy Race.
Sun., 6th. London Air Park Flying Club: Garden Party.
Sat., 12th. Eastbourne Flying Club: Flying Display and Garden Party.

SEPTEMBER.

Sat., 2nd. King's Cup Race and Wakefield Trophy Race, Birmingham.
Sun., 3rd. Gordon Bennett Balloon Race, Poland.
Sat., 16th. Cinque Ports Flying Club: Wakefield Cup Race.
Sat., 23rd. Cardiff Aeroplane Club: London-Cardiff Race.

OCTOBER.

Sun., 1st. Aero Club de France: Coupe Deutsch de la Meurthe, Etampes.
Mon., 2nd-Sun., 17th. Milan Aero Show.

The Lord Mayor of Birmingham, Ald. James Crump, welcomes H.R.H. the Duchess of Kent immediately prior to the opening ceremony. Mr. Neville Chamberlain is on the right, and on the left are Sir Kingsley Wood and Ald. A. H. James, the chairman of the Airport Committee.

BAD WEATHER FOR BIRMINGHAM'S AEROM

H.R.H. the Duchess of Kent Performs the Ceremony : A Good Display Despite Low Clouds and Heavy Rain

Illustrated with "Flight" photographs

WITH, on that one particular day, such truly appalling weather for the Elmdon opening and concurrent display, we might reasonably start with a few paragraphs of commiseration for the Airport Committee and for the even more, though temporarily, suffering general public. Instead, we will praise the Service and the civilian efforts which enabled the afternoon's flying display to be carried through with comparatively small modifications and not many cancellations.

Not only did the cloud base come down on occasion to about 300ft., but both heavy rain and considerable bumps must have made it most uncomfortable and difficult, particularly for those pilots taking part in the Fleet Air Arm and the Royal Air Force events which formed the major part of the programme. Yet the formations were still very nearly perfect, and all the Service squadrons got through to Elmdon from their stations. Some of the Spitfires, admittedly, were grounded at Hucknall, where the clouds were almost on the ground and visibility reduced to the length of the aerodrome, but two flights went through their air drill according to plan.

With the particular arrangement of certain of the enclosures, those cars used for official and other transport had to be driven over the aerodrome itself, and it was sad to see the grass turn to mud over a track which became wider and wider as the day progressed. One wonders how long it will be before that ugly mud streak, which, when the palisades are down, will run right across the middle of the aerodrome, is green grass again. This was just one of the payments for an official opening day.

A word should be added in praise of the private owners and club pilots who scraped through, Bradshaw-wise and otherwise. Something like a hundred were expected—but not on the morning of the event. Actually, both the organisers and the control staff were very surprised to see more than half a dozen. Those members of the general public who became steadily wetter and muddier during the day could comfort themselves with the thought that the conditions for the organisers and officials were equally difficult in another way. Theirs was mental as well as physical discomfort. During the whole morning telephones were continually ringing in the control tower, where Capt. Lamplugh was in charge, with demands for weather information and advice. In the circumstances his responsibilities, and those of his assistants, were considerable, and rules which might have been slightly less stringent in other conditions had necessarily to be rigidly enforced. There were no accidents or incidents, though there were probably quite a few aeroplanes dotted about in

The distinctly damp scene on the tarmac in front of the terminal building while the Duchess of Kent was unveiling a commemorative plaque in the main hall of the building.

ROOME OPENING

various parts of the country after the pilots had made unsuccessful attempts to get through to Elmdon.

Unfortunately enough, the worst of the weather coincided with the opening ceremony itself, and the speeches were made towards a drenched public from the balcony at the north end of the first floor of the control building.

After unveiling a commemoration plaque in the main hall and being driven round the enclosures, H.R.H. the Duchess of Kent declared the airport open, congratulating the city, and all those concerned, on their enterprise. When Ald. A. H. James, the chairman of the Airport Committee, had suitably thanked Her Royal Highness, he asked her to accept a gift from the Committee in honour of the occasion. He himself afterwards received a presentation from Mr. Neville Chamberlain.

The Prime Minister referred first of all to the visit of the King and Queen to Canada and the United States, saying that, though it was early yet to estimate the effects of this visit, he was quite certain that it had made a most valuable contribution both to the unity of the Empire and to the friendship between the English-speaking peoples. Events had made it necessary recently to concentrate rather on Royal Air Force expansion than on the development of civil aviation. In consequence, our Air Force was, in many ways, the finest in the world. Nevertheless, those who had been responsible for Birmingham's new airport had planned wisely for the future. He had no doubt that, if and when we emerged from the present condition of international tension, there would be an unprecedented development in civil aviation.

Sir Kingsley Wood afterwards spoke, describing the new airport as further evidence of Birmingham's determination to march with the times. We should, he said, never forget the real object for which air navigation was intended—as a link between nations. For the present the presence of a Volunteer Reserve School to the new airport was not only a necessary, if unhappy, reminder of the present critical state of international affairs, but also a sign of the efforts which were being made to improve the country's defences. The balloon barrage was also an important part of the defence system, and Sir Kingsley was glad to announce the appointment of the Prime Minister as Honorary Commodore of the new No. 915 (County of Warwick) Squadron.

Before the Fleet Air Arm Skuas took off for their part of the programme, Mr. R. A. C. Brie demonstrated a C.40 Autogiro. Although the strong and gusty wind made his more-than-vertical descents extremely effective, the very bumpy conditions near the ground must have caused him a good deal of anxiety which was not, however, noticed by the spectators. The C.40 was, in fact, one of the only two civil machines to be demonstrated. The other was the Piper Cub Coupé, which the programme described as having been "designed and built" at Rearsby; erected, perhaps, but not designed there. Unfortunately another civil machine which might have been expected to have put up one of the most exciting displays in the afternoon, the civil-registered Hawker Hurricane, was held up at Brooklands. This machine, which was to have been flown by one of the Hawker test pilots, has a boosted Merlin and constant-speed airscrew—and a consequently dashing performance.

As originally planned, the Fleet Air Arm demonstration should have been very similar to that given at the Derby airport opening a few weeks ago, but the height (or lowth) of the cloud-base prevented the dive-bombing demonstration, and only permitted very flat converging attacks, by flights, on the control tower. However, bumps or not, the pilots put up a very convincing display of formation flying, and, later on, one flight demonstrated deck-landing proce-

Before and after the passage of a warm front. In the top picture the Air Council D.H.86, bringing Sir Kingsley Wood, arrives in one of the many downpours, while below, in the better weather conditions of the late afternoon, the A. W. *Eddystone* prepares to return to Croydon. The machines behind the 86, in the top picture, are the Gladiators.

dure with a strip of canvas to simulate the deck of an aircraft carrier, and a mobile tower (presumably made up out of a Corporation overhead-wire repair lorry) as the "island." This performance was helped to some extent by the strong wind. As might be expected, one of the Skuas was brought in with the undercarriage up in order that the deck and control officers might have a chance of demonstrating the "do not land" signals.

By this time the cloud-base had gone up a little and the pilots of the Supermarine Spitfires from No. — Squadron did not have quite such a difficult time as they might otherwise have had for their formation flying. The designs made by the eight machines, from a flat "O" to boxes in line abreast, were very nearly perfect—certainly much more so than might have been expected in such conditions.

The next events were smoke-bomb low-level attacks by a flight of Bristol Blenheims, and a demonstration of supply-dropping by a flight of Westland Lysanders. In the latter case there might almost have been no need for a car to go out and collect the parachutes, since one of them blew right across to the boundary, and at least two more gave every indication of doing so before prematurely collapsing. Immediately afterwards No. 605 (County of Warwick) Squadron left for their home at Castle Bromwich.

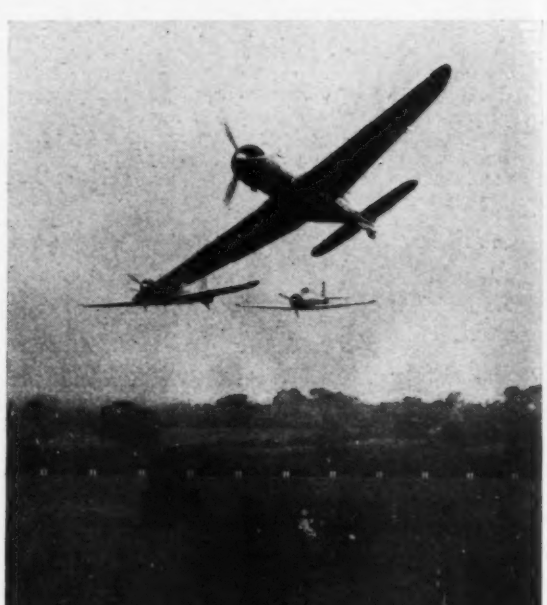
All the promised individual machines for the parade of new Service types managed to get through, and flew past in the usual way, the "slowest" first. This was the A. W. Whitley; then came a Handley Page Hampden, a Bristol Blenheim, a Hawker Hurricane, and, finally and excitingly, a Supermarine Spitfire. Separately, a Bristol Bombay had previously been flown by as a demonstration of troop carrying, and immediately afterwards three barrage balloons, from Cardington, were "unwinched." The regulations say that such balloons must be flown not less than 500 feet below cloud. Actually, the cloud had, in the meantime, gone up to something well above 1,000ft.; but earlier in the afternoon it would have been necessary for the crews to dig pits before they could legally fly them.

Transport Types

Two modern transport types were to be seen, but neither gave a demonstration in the ordinary sense of the word. The first of these was the A.W. *Eddystone* which was to have taken up members of the Corporation, but which, possibly because of the prevailing weather conditions, went straight back to Croydon at the end of the afternoon. The other was the prototype De Havilland Flamingo, which is now owned by Jersey Airways and which brought over various directors of the company. Capt. Caldwell, Jersey's chief pilot, was officially in charge, though Mr. G. de Havilland was with him as "instructor." Next year it is probable that Jersey Airways will buy more of this type. *Eddystone* was brought over by Capt. Perry. British Airways was represented by Mr. R. H. Maxwell, the commercial manager, but could not spare a machine from the European services. Western Airways, who, with Olleys, were doing what joy-riding there was, had their new D.H.86 as well as three Rapides, a Dragonfly and a Dragon parked in front of the enclosures. Another civil machine was the Royal Airspeed Envoy III which had previously brought the Duchess of Kent to Walsall. By 6.30 p.m. another warm front had arrived, and the finale, in the inevitable form of two parachute descents, had to be abandoned.

There had been something like three hundred guests at the previous evening's official banquet. Ald. Sir Ernest Canning, the Deputy Mayor, was in the chair, and the Air Ministry was represented by Sir Francis Shelmerdine, the D.G.C.A.

In proposing the toast of "Civil Aviation and the Airport of Birmingham," Sir Francis said that Birmingham, through the Midland Aero Club, had been interested in aviation for the last thirty years, and he was glad to see that Major Gilbert Dennisson, one of the founders of the club, was present. He then recounted a little of the post-war history of Birmingham, when Castle Bromwich was one of the few Service aerodromes retained for civil use. The Midland Aero Club became one of the first of the aeroplane clubs to start operations in 1925, while in the following year an Auxiliary Squadron was formed at Castle Bromwich. Even in those days it was seen that this aerodrome was not really suitable for civil use, and the Elmdon project was put forward as long as eleven years ago. For most of the period since then Ald. James had been chairman of the Airport Committee.



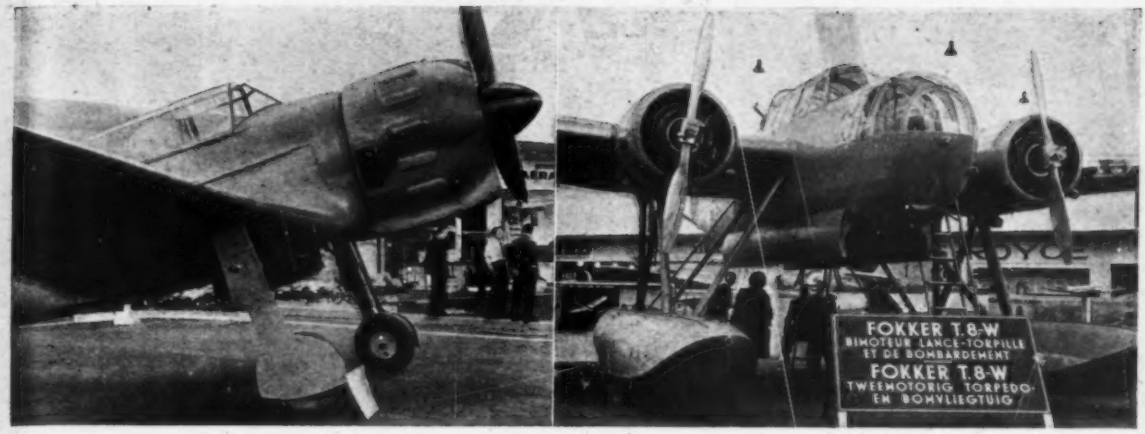
Low clouds prevented the Fleet Air Arm Skuas from dive-bombing, but the pilots managed to carry out the close-range converging attack in their programme. The mobile building which can just be seen on the aerodrome is the aircraft carrier "island" used for the dummy deck-landing demonstration.

At the present time civil aviation was going through a difficult time because all energies had to be devoted to the re-armament programme. There were over forty licensed municipal aerodromes, and every suitable one was, or shortly would be, used for Volunteer Reserve training. Club, Army co-operation and Reserve flying at least gave municipal airport owners temporary assistance until civil aviation came into its own. In the meantime, really modern civil aircraft were on order in British factories and in due course the Air Ministry hoped to see Birmingham airport in use to something like full capacity for commercial air services.

In his reply Ald. A. H. James particularly praised the work of the other members of the Airport Committee, and said that, though there had been opposition, those who criticised him should now recognise what had been done to provide facilities in Birmingham for civil aviation—about the future of which he was ineradicably optimistic. He had never, however, been deceived about the cost, and for years to come the new airport would be a financial burden. Eventually it would produce a handsome revenue. In any case, the indirect advantages and assets of an airport to such a city as Birmingham could never be adequately measured.

Proposing the toast of the "Royal Navy and the Royal Air Force," the chairman, Sir Ernest Canning, said that it was remarkable how national opinion and outlook could vary in the course of a few years. Only recently we had been trying to show the world the way to disarmament, but now we had been forced to spend more money on the fighting services than ever before. He seemed to remember certain differences of opinion about whether the Fleet Air Arm should be under the control of the Navy or the Royal Air Force; eventually the Navy got its own way, but we could be assured of the heartiest co-operation between the two.

Vice Admiral Sir Alexander Ramsay, the Fifth Sea Lord and Chief of the Naval Air Services, and Air Vice-Marshal T. L. Leigh-Mallory, the officer commanding No. 12 Group of the R.A.F. and in charge of the air defence system from Cambridgeshire northwards, each replied. Sir Alexander said that the Fleet Air Arm was very glad of the chance it would have on the following day to show its existence to the public, and Air Vice-Marshal Leigh-Mallory, in an almost too realistic description of future possibilities, tried to show how the morale of an enemy air attacking force would necessarily be severely shaken before reaching an inland centre such as Birmingham; so much so that eventually the volume of air attacks would certainly be very much reduced.



TWO MORE FROM BRUSSELS: The Bloch 151C 1 *bicanon* fighter and the Fokker T8.W torpedo-bomber seaplane; the torpedo is carried internally.

HERE and THERE

The National Gliding Contest

THE first two days of the National Gliding Contest, which is being held this year at Great Hucklow, Derbyshire, were not too satisfactory, though quite a fair amount of flying was done. Last Saturday the clouds were almost on the ground and there was continuous rain.

On Sunday conditions were excellent for duration flying, with a wide belt of rising air along Bradwell Edge, and at one time there were sixteen sailplanes in the air at once; two five-hour flights were made. Unfortunately, conditions were by no means so ideal for cross-country flying, since thermals were few. The best flight was made by Mr. Philip Wills, in his Minimoa, who just managed to obtain some lift at a critical moment and reached a position 37 miles from the starting point. He had declared Grantham as his goal, but only managed to reach Tuxford.

A Balpa Year

WHEN the British Air Line Pilots' Association was first formed, many people feared that its trade union characteristics might actually prove a hindrance rather than a help to British aviation—by working, in the same way as other trade unions, for the immediate benefit of its members rather than for the ultimate good of aviation.

The report of the Association for the year 1938-9 at any rate shows that this fear was quite unjustified. The BALPA has used its power with moderation, and in only one case has the central board of the Association found it necessary to intervene on behalf of its members. This was when a deadlock occurred between Isle of Man Airways and the pilots' council of the company after nearly a year of negotiation. Two meetings were held between representatives of the company and the BALPA central board, and the result was an increase of salary for the pilots of £125, bringing up the total to £800 a year. Certain difficulties which had arisen with regard to wireless and other equipment were also discussed and satisfactorily settled.

A working agreement has also been reached between the Association and the Guild of Air Pilots and Air Navigators. An offer was made by the G.A.P.A.N. some time ago, and after a ballot in the Association, this was accepted when finally a suitable formula was found. The present arrangement is for a trial period of a year, and during this time the offices of the Association have been moved to 14, Thavies Inn.

One of the ways in which the Association is making its weight felt is through its representation on a variety of committees which formerly were without someone to present the point of view of the working airline pilots. The Association has been represented on the Advisory Committee of the Air Registration Board for working out syllabuses of examinations for the extension of "B" licences, and on the Air Ministry Committee dealing with the training, qualifications, testing and licensing of pilots. In February BALPA was offered and accepted a seat on the Air Safety Committee of the National Safety First Association. BALPA was also represented at the Air Ministry conference in October last year on the question of allowing "A" licence pilots to instruct.

In 1937, the Association had made a proposal to the Air Ministry that airline pilots should be allowed to test new types of aircraft prior to the issue of a C. of A. This proposal at last seems to have taken effect, as the Air Registration Board has notified the Association that it proposes to depend on flight tests made by one pilot nominated by the applicant and two pilots nominated by the Board. The Air Registration Board sought and received the help of the Association in producing the necessary list of suitable pilots.

Another activity of the BALPA has been concerned with pilots' insurance. A special scheme has been got out with quite favourable rates, which will probably be of interest to many pilots who would be quite shocked if they ever took the trouble to read their present policies. Many of these do not cover loss of a "B" through an accident.

The Association, altogether, seems to have done nothing spectacular during the year, but, in a quiet way, is making itself felt. It is undoubtedly to be congratulated on its forbearance from exploiting the present shortage of pilots—as some of the more militant trade unions might undoubtedly have done.

Death of a German Pioneer Designer

AVIATION circles the world over learned with deep regret of the death in Berlin last week of Dr. Adolph Rohrbach, the famous German aircraft designer, at the early age of 51.

Dr. Rohrbach's aeronautical career dates back to the early days of flying. For a period both he and Dr. Claude Dornier were in the employ of the Zeppelin company, and while Dornier specialised, at quite an early date, in the design of flying boats, Rohrbach concentrated on landplanes, of which he designed a considerable number of types. He was always rather ahead of his time, and it should be placed to his credit, now that he is no longer among us, that as early as 1917 he designed the big four-engined Zeppelin-Staaken cantilever monoplane, which was possibly too far advanced for the time, but which would not look out-of-date at the present time. It should equally be placed to the discredit of the Allies that, at the end of the war, that machine was ordered by the Inter-Allied Air Commission to be broken up, a wanton and senseless piece of work which only people devoid of vision could have sanctioned.

Shortly after the war Adolph Rohrbach formed his own company and began the design and manufacture of landplanes and seaplanes. The forerunner of the former was the Roland, and of the latter the Romar. Dr. Rohrbach should go down to history as the champion of high wing loadings. In this, as in so many other things, he was ahead of his time. He used high wing loadings in the days before high-lift devices made them really practicable, but he did produce machines which had high operating speeds.

In the days when Wm. Beardmore and Co., Ltd., ran an aircraft department, they secured the British rights in the Rohrbach monoplane, the British version of which became known as the Inflexible (nicknamed by the A.I.D. the "Brittle," because a thing which was inflexible *must* be brittle).

In the flying boat field Rohrbach's name will always be associated with hulls of narrow beam and great depth—the "plank-on-edge" idea of yachting applied to flying boats.

In Adolph Rohrbach the aviation world has lost a brilliant man. Let us honour his memory not only for the work he did after the war, but equally for that which he did while he was our enemy.

In this view of the production Cygnet the way in which the deeper cabin fairs into the monocoque fuselage is clearly shown, with one of the two split flaps.

THE NEW CYGNET

Production Version of an All-metal Private-owner and Training Type with a Tricycle Undercarriage : Alternative Power Units

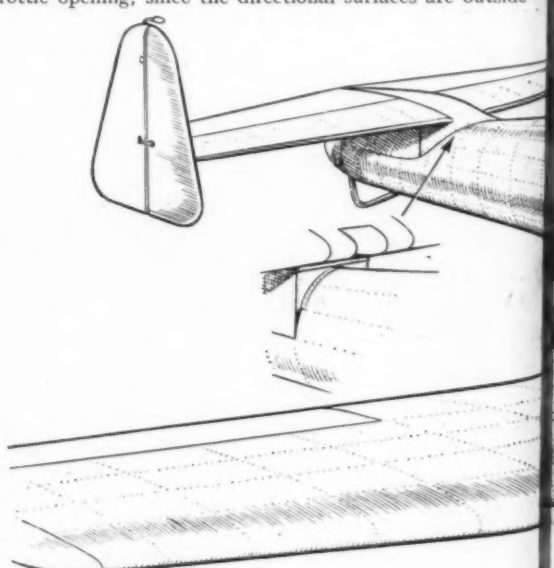
(Illustrated with "Flight" photographs and sketches)

SINCE the major attentions of the aircraft industry have recently been directed towards the manufacture of military types, not a very great deal of energy has been applied to the problem of deciding on and actually making a specialised machine for the private owner and the club. During the past year, in particular, doubts have been expressed about the potentialities of this market, and the tendency, except in one or two important cases, has been to leave it well alone. The fact is that only after quantity production of such a type has been started—with the consequent reduction in costs where metal construction is concerned—can the potentialities of the market be properly discovered. Only a firm with ample backing can take the plunge, and then only with a machine which has some, or all, of the features which are likely to remain or become commonplace during the next year or two.

The Cygnet, which was the first stressed-skin metal-covered aeroplane in the lighter class to be made in this country, is now a product of General Aircraft, though the prototype was originally designed and made by C. W. Aircraft, one of whose directors, Mr. Chronander, is now in the G.A. design office. Consequently, the company has not had to start at the very beginning, and the prototype has been flying successfully during the last two years. Since General Aircraft took the machine over it has been considerably modified, notably in the application of a tricycle undercarriage and in the fitting of a twin-rudder tail unit. At the same time, practical experience has shown the need for detailed alterations, and the entire design is now even more capable of quantity production at reasonable cost. Naturally enough, an all-metal machine, however carefully designed, is not likely to be particularly cheap, but by way of compensation it should be more robust and more capable of standing up to exposure in all weathers. This last should give the Cygnet a special appeal in the Colonial markets.

At first glance the General Aircraft Cygnet, with its tricycle undercarriage, is somewhat quaint in appearance, but the manufacturers are probably correct in thinking that not only will this quaintness "wear out," but that this type of undercarriage will, in any case, be more or less universal later on. With the tricycle goes the twin-tail arrangement and limited elevator control. These ensure viceless characteristics both on and off the ground, particularly when they are coupled with a structure designed to withstand rough usage.

Apart from providing directional stability at and after the stall, the twin-rudder arrangement means that there is little or no tendency for the machine to swing at any throttle opening, since the directional surfaces are outside



the slipstream area. The limited elevator control means that, in normal circumstances, the Cygnet has a safe measure of lateral and directional control even when the column is held right back against the stop.

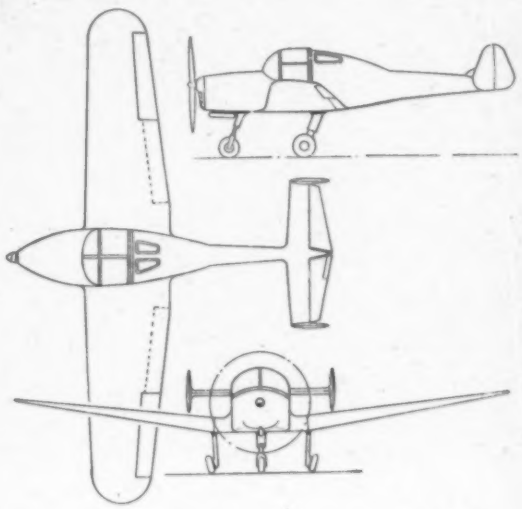
There is no need here to expatiate on the principles and advantages of the tricycle arrangement, which not only permits a landing to be made at any reasonable speed without the possibility of ballooning, but also offers that almost

more important advantage of directional stability while taxying, taking off and landing. A machine so equipped can be handled on the ground like a car.

The structural features of the prototype Cygnet were described in *Flight* of December 10, 1936. Briefly, the machine is a low-wing cabin side-by-side two-seater. The wing is built up in three major parts—the centre section and two outer extensions—though the production model has detachable wing tips for ease of manufacture and damage replacement. Treated as a whole, the wing has two extruded alloy main spars and solid diaphragm ribs. Shear and torsional loads are taken by the duralumin skin covering.

The fuselage is partly of monocoque and partly of steel tube construction, the basis being a duralumin "box" which is bolted to and helps to stiffen the centre-section spars. Fore and aft of this section are the steel tube structures, which are now riveted and not welded. The triangulated structure behind the centre section is attached at four points to the forward end-frame of the monocoque remainder of the fuselage. The tailplane, which is generally similar in structure to the wing, is carried on a special built-up and faired-in support at the rear of the fuselage, and has the fins and rudders at either end. In its latest form, with a tricycle undercarriage, the main undercarriage legs are, of course, attached to the rear centre-section spar, while the forward leg is attached to the fireproof bulkhead through a shear panel. The cabin enclosure is not part of the basic structure, and its aft portion fairs into the rear fuselage.

As already explained, the changes made in the production type have been partly those designed to simplify manufacture, but a number of detail modifications have been made in the light of test experience with the prototype, and it has been neces-

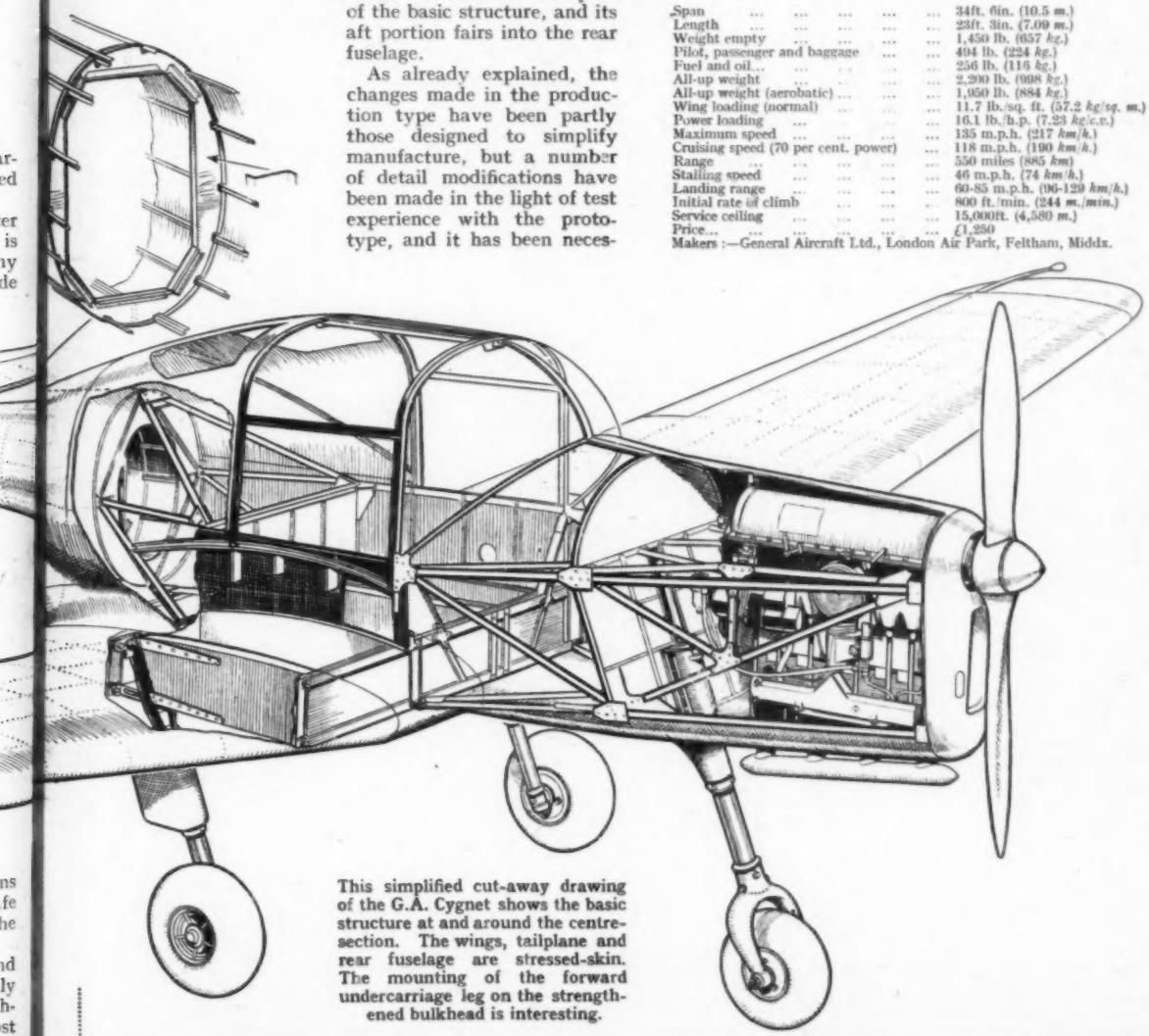


THE GENERAL AIRCRAFT CYGNET.

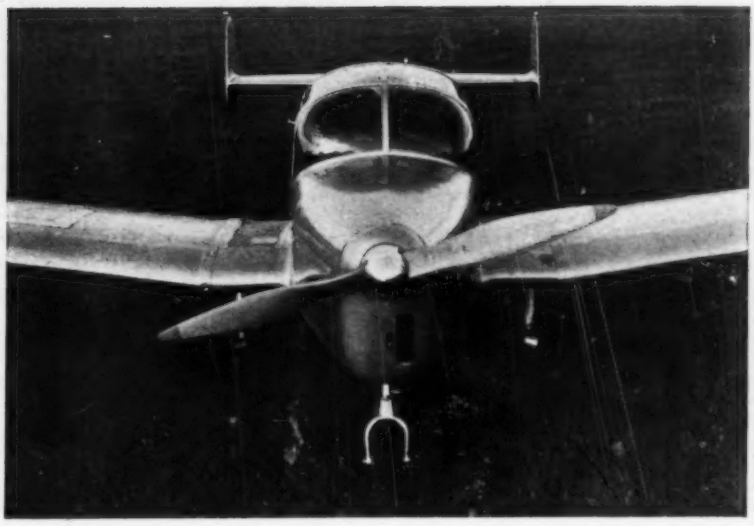
Figures for 130 h.p. Gipsy Major; the 150 h.p. Cirrus Major is alternative power unit.

Span	34ft. 6in. (10.5 *m.*)
Length	23ft. 3in. (7.09 *m.*)
Weight empty	1,450 lb. (657 *kg.*)
Pilot, passenger and baggage	494 lb. (224 *kg.*)
Fuel and oil	256 lb. (116 *kg.*)
All-up weight	2,200 lb. (998 *kg.*)
All-up weight (aerobatic)	1,950 lb. (884 *kg.*)
Wing loading (normal)	11.7 lb./sq. ft. (57.2 *kg/sq. m.*)
Power loading	16.1 lb./h.p. (7.23 *kg/c.v.*)
Maximum speed	135 m.p.h. (217 *km/h.*)
Cruising speed (70 per cent. power)	118 m.p.h. (190 *km/h.*)
Range	550 miles (885 *km*)
Stalling speed	46 m.p.h. (74 *km/h.*)
Landing range	60-85 m.p.h. (96-129 *km/h.*)
Initial rate of climb	800 ft./min. (244 *m./min.*)
Service ceiling	15,000ft. (4,580 *m.*)
Price	£1,250

Makers :—General Aircraft Ltd., London Air Park, Feltham, Middx.



This simplified cut-away drawing of the G.A. Cygnet shows the basic structure at and around the centre-section. The wings, tailplane and rear fuselage are stressed-skin. The mounting of the forward undercarriage leg on the strengthened bulkhead is interesting.



A front view of the production Cygnet showing the good ground range of vision through the moulded screen and the increased depth of the cabin.

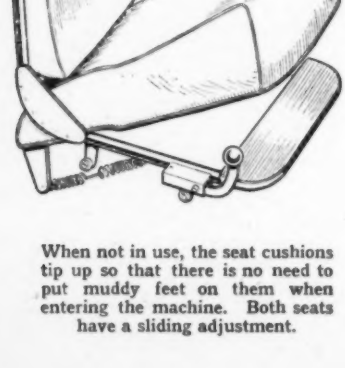
sary, of course, to re-stress the centre-section area in order to take the extra loads involved in "tricycling" and the forward bulkhead is now designed to take a proportion of the landing loads. The oleo-pneumatic legs of the undercarriage are, incidentally, of General Aircraft design, and all three are carried in Elektron castings bolted to the rear spar and the forward bulkhead respectively.

Superficially, and forgetting the tricycle and twin rudders, the most noticeable difference is in the design of the cabin; this is six inches deeper, so that the pilot and passenger have a very much better view, and entry on each side is made through sliding doors. These doors have runners which travel at the top in two channels in the central roof member, and at the sides in similarly curved channels. Not only is it now very much more easy to enter, but the doors have been designed so that the machine may, in warm weather, be flown with one or both of the doors slid back, either partly or entirely. Each is held in its intermediate position by a spring-loaded pin arrangement. With such a range of door-opening adjustment no separate sliding windows are provided. The roof section of each door is of special tinted glass to keep the interior cool and to prevent dazzle.

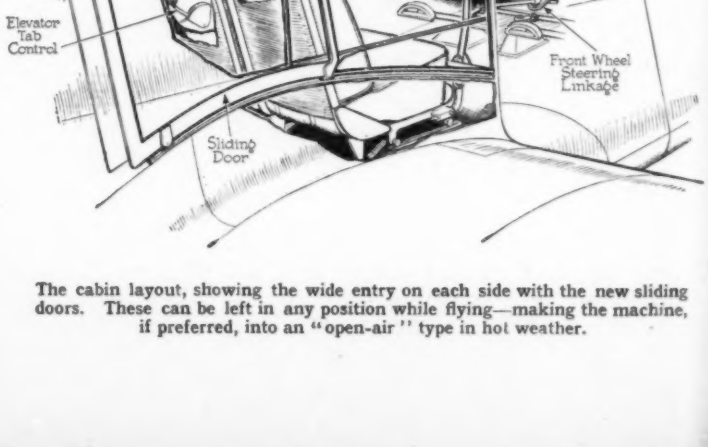
Each of the seats is adjustable fore and aft on slides, and the backs are high enough to give ample support. One small practical point is that the seats themselves spring up backwards out of the way when there is no load on them, so that in stepping into the machine there is no possibility that muddy shoes will touch the upholstery. The seats are designed to take parachutes. The forward bulkhead is soundproofed with asbestos wool between the bulkhead structure itself and a perforated covering panel, which is itself part of the soundproofing scheme.

In the prototype the front undercarriage wheel could be locked in the fore and aft position in order to simplify the take-off. In the course of experiments, however, the trail angle of this wheel has been so designed that the locking device may now be omitted. The wheel is still, of course, directly steerable through the rudder bar. All three legs are fully cantilever.

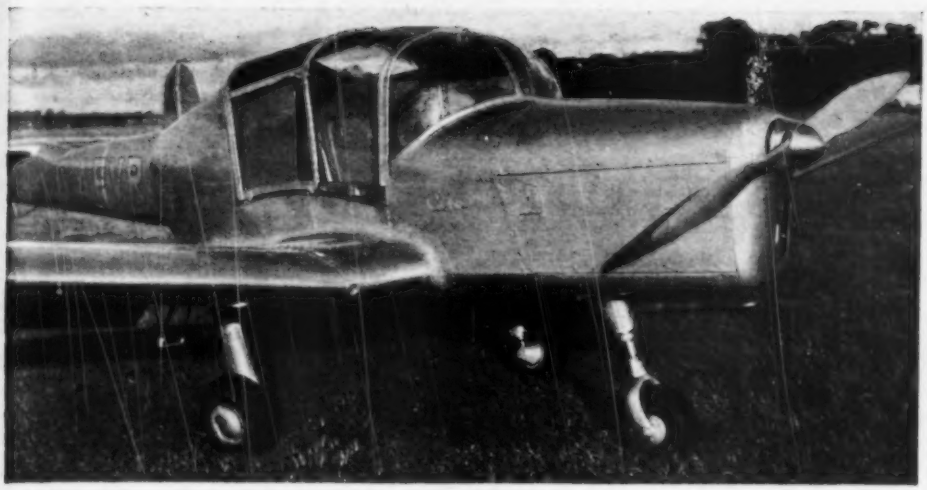
In order that no possible trouble shall be experienced with air or vapour locks in the fuel system, this, with its collector-box, has been very carefully designed. The vent pipes from each of the two tanks are taken to a single point by the highest practical route so that there is no risk of an air-lock after taking up a semi-aerobatic attitude, and so that the static pressure is the same in each tank. The collector-box, too, has its own vent, and the main fuel tap is on the engine side of the box; consequently, it is not possible to fly on individual tanks. A non-return valve prevents the fuel from passing between one tank to the other; these, therefore, must be filled separately, and there is no chance that a temporarily false level will be given in one or other during the refuelling process. The tank levels are read off in the cabin by constant acting hydrostatic gauges. The total fuel capacity of the standard Cygnet is thirty gallons, while three gallons of oil are carried in a tank in the leading edge. As a final safeguard, the dashboard fuel tap control is arranged with the ignition switches so that the latter cannot be switched on until the former has been turned on. The filler caps are in recesses in the wing which take any overflow.



When not in use, the seat cushions tip up so that there is no need to put muddy feet on them when entering the machine. Both seats have a sliding adjustment.



The cabin layout, showing the wide entry on each side with the new sliding doors. These can be left in any position while flying—making the machine, if preferred, into an "open-air" type in hot weather.



A three-quarter view of the Cygnet with one door slid back on its runners. The tricycle undercarriage is now fully cantilever. A Cirrus Major engine is fitted to the first production machine which is shown here.

The dashboard has been arranged so that complete blind-flying equipment can, when required, be fitted without alteration, and this will be carried in a special panel in the centre, with the normal instruments on either side. The pull-type brake lever is in the centre of the dashboard with the ignition-cum-fuel arrangement a little to its right. A complete dual control system is a standard fitting, with the throttles on each side of the cabin, and there are cubby holes for incidentals below the dashboard. The flap operating switch is on the right side of the panel. This switch controls the Theed vacuum system, the container for which lies between the dash and the forward bulkhead. As in the earlier machine, the flaps are of the normal split type and are in two sections, each extending from the centre section to the aileron. The vacuum "power" is obtained from the induction system in the usual way, and the container carries sufficient depression for operation of the flaps in the event of engine failure. By moving the control switch to "off," the flaps can be left in any position between fully up and fully down.

Fore and aft trim is carried out by means of the normal tab, but in this case the control is irreversible, so that there is no chance that the tab may move and so alter the trim. Either a Gipsy Major of 130 h.p. or a Cirrus Major of 150 h.p. may be fitted to the Cygnet, and it is worth mentioning here that for simplicity of manufacture the engine mountings are quite straight and have no kinks.

A good deal of attention has been paid to the provision of inspection facilities at various points of the structure, and such items as control details can be reached through rubber inspection doors. Quick-acting Oddie fasteners are used throughout. For the manufacture of the various parts, small stressed items such as ribs are made in an hydraulic press, while all shapings, including the cabin covering and engine cowling, are worked by a drop hammer.

In the standard equipment is included full dual control, a fire extinguisher with spray leads to the carburettor, a compass, a turn and bank indicator, and an eight-day clock. Additionally ordered equipment can include navigation lights and an electric starter, with the necessary battery and wind-driven generator, and an artificial horizon and directional gyro in a special panel.

Some Contributors to the Cygnet

Engine by Blackburn (Cirrus) or De Havilland (Gipsy); Fairey metal airscrew; Smith's instruments; K.D.G. fuel gauges (Korrect Depth Gauge Co.); flying controls by M.R.C., Ltd.; Theed vacuum flap operation (Sir George Godfrey and Partners); Dunlop wheels and tyres; Bendix brakes; tubing by Accles and Pollock, Ltd.; magnesium alloy castings by Sterling Metals, Ltd.; Oleo legs (to General Aircraft design) by Aero Engines, Ltd.; Toe straps and inspection doors by the Palmer Tyre, Ltd.; "Doverite" covering on handles, etc. (Dover, Ltd.); cowling fasteners by Oddie, Bradbury and Cull, Ltd.; waterproofing by Wilkinson Rubber Linatex; upholstery by Rumbold; windscreen panels by Eagle Components, Ltd.; Dunlopillo cushions by Latex Upholstery, Ltd.; "Bexoid" tinted transparent sheet (British Xylonite Co., Ltd.).

Hawker-Siddeley Board Reshuffle

IT is announced by the Hawker-Siddeley Aircraft Co., Ltd., that in order to devote himself exclusively to the development of that company Mr. T. O. M. Sopwith, its chairman, has decided to retire from the chairmanship of the Armstrong Siddeley Development Co., Ltd., and its subsidiary companies. He will, however, continue to serve as a director. His place as chairman in these companies is being taken by Mr. F. S. Spriggs, who has hitherto been managing director. Mr. H. K. Jones will become managing director of Armstrong Siddeley Development and its subsidiaries.

Their many friends in the aircraft industry will welcome very heartily the promotions which these appointments represent. Mr. Spriggs was for many years secretary to the Hawker company, where his great ability was largely responsible for the high position which that company achieved and has maintained ever since. Mr. Jones will now have his hands very full as managing director of the numerous companies, but no one who has seen him in his shirt sleeves at No. 3 "St. Jones's Square" (and who has seen him clad any other way?) will have any doubt of his ability to carry the new burdens.

By Air to Brussels Show

FOR the remainder of the Brussels Aero Show period—until July 23 outward or July 28 homeward—British Airways are offering a 10 per cent. reduction on their single and 18- and 60-day return fares between London and Brussels. The concession is limited to "identified members of firms in the aircraft trade and allied industries," upon production of their official *carte de legitimation*.

International Air Congress in England

AN International Air Congress is to be held at Stratford-on-Avon from July 8 to July 13, 1940, organised by the Royal Aeronautical Society, at which there will be papers and discussions on the technical aspects of aviation. A programme of social entertainments, including two banquets, a ball, a garden party, luncheon parties and visits to places of historical interest in the neighbourhood of the town celebrated as the birthplace of Shakespeare is being arranged.

It is hoped that as many visitors as possible from home and abroad will join as members to make the Congress an unqualified success. Wives and families of members will be enrolled as associate members for the period and will be welcomed.

A detailed programme will shortly be available which will include estimated costs to those attending the Congress. In the meantime any further information which may be required will be gladly supplied by the Organising Secretary, International Air Congress 1940, 4, Hamilton Place, London, W.1.

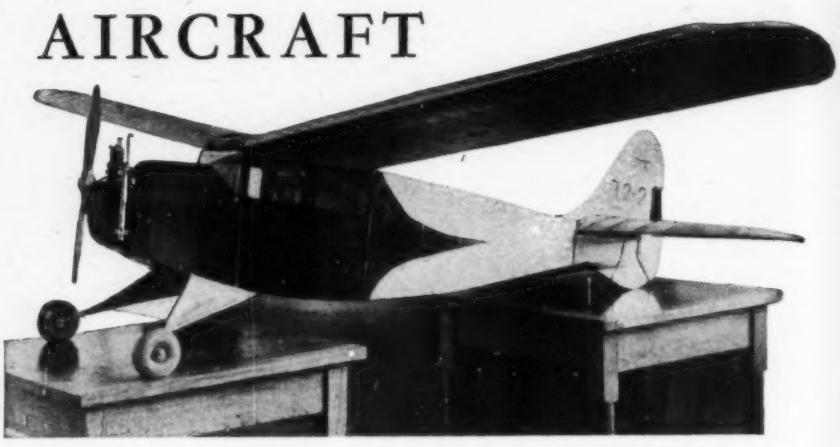
Aircraft Fire-fighting Installations

IN a reference to the Graviner fire-fighting equipment in the Vickers Wellington it should have been stated that methyl-bromide, and not CO_2, is the extinguishing medium employed.

Methyl-bromide is the only medium approved by the Air Ministry for the purpose. Graviner equipment, it is stated, has been adopted as standard for all types of Service aircraft.

MODEL AIRCRAFT

Petrol Models at an R.A.F. Station : Two Contrasting Machines Described : Lt. Col. Moore-Brabazon Opens a Meeting



Winner of a *Flight* Cup for petrol models — Mr. John Coxall's monoplane.

Petrol Planes at Cranwell

THE local jinx was active at Cranwell Aerodrome on June 11, when, by permission of Air Vice-Marshal J. E. A. Baldwin, C.B., D.S.O., O.B.E., petrol-engined models competed for the *Flight* Cup. Heavy rainstorms necessitated a curtailment of the proceedings, but not before the assiduous organising efforts of Sqn. Ldr. E. S. Borthwick-Clarke, W/O. Gutteridge, Flt. Sgt. Crittall and S.M.A.E. officials had been rewarded by some excellent flying.

Each machine was required to make two rise-off-ground flights, loss of points resulting from a flight duration below or above a figure pre-determined by ballot, and bonus points being added for originality, workmanship, take-off, stability, and landing. Out of 18 models taking part, 17 were of the popular high-wing type, of which considerable experience has been amassed by modellers. The standard of behaviour of models and motors certainly seems on the up-grade, but one would like to see some British motors challenging the popular American types.

Mr. John Coxall, of the Hayes and District M.A.C., scored 117 points to win the contest. His 9ft. constant-chord high-wing, powered by a 9 c.c. Dennymite (the latter the product of the firm with which Mr. Reginald Denny, the film actor, is associated) is described and illustrated on this page.

A junior member of the Surrey M.A.C., Mr. A. J. Hayes, scored 112 points with another Dennymite-powered constant-chord high-wing, and Mr. C. R. Jeffries (Midland M.A.C.) secured 107 with the largest machine in the contest, a constant-chord high-wing of 10 or 12ft. span, with an American 9 c.c. Brown Junior.

A very attractive cabin biplane, flown by Messrs. J. and W. Worden, of The Model Aircraft Club, made several excellent flights, its shapely lines and well-cowled Brown Junior being much admired. Fine flights, devoid of any stalling tendency, were made by an 8ft. constant-chord high-wing weighing 8½lb., built by Mr. E. H. Wilson, of Leicester. The 12½ c.c. motor installed therein was also of his devising.

An attempt on the British petrol-model record, which since 1937 has stood at 16 min. 25 sec., was made by Mr. Coxall, but strong drift and poor visibility were against him. After 6 min. 45 sec., the model passed out of the timekeeper's vision, rendering the attempt void.

Winner of the "Flight" Cup

MR. COXALL'S *Flight* Cup winner has a span of 9ft., and a constant chord of 1ft. The aerofoil section is fairly thick, and has a pronounced concave lower surface, giving high lift and good gliding characteristics. The take-off, stability, wind-fighting ability and landing are exemplary.

Longerons and certain cross-members are of ¼in. × ¼in. spruce, subsidiary struts being of balsa. The undercarriage is faired with rubber tyre-patching material. The pneumatic wheels are 3½in. in diameter. A tailplane of lifting section is employed, its span being 3ft. 6½in. There is a trimming tab in the rudder. Jap silk is used for covering the entire model, which is 5ft. in length, weighs 7lb., and has a wing-loading of 14oz. per sq. ft. As mentioned, the engine is a 9 c.c. Dennymite "Airstream."

Just prior to the *Flight* Cup contest, this model won the Southern Counties Challenge Cup, the contest being held at Boscombe Down Aerodrome in very gusty weather.

"Northern Heights" Gala

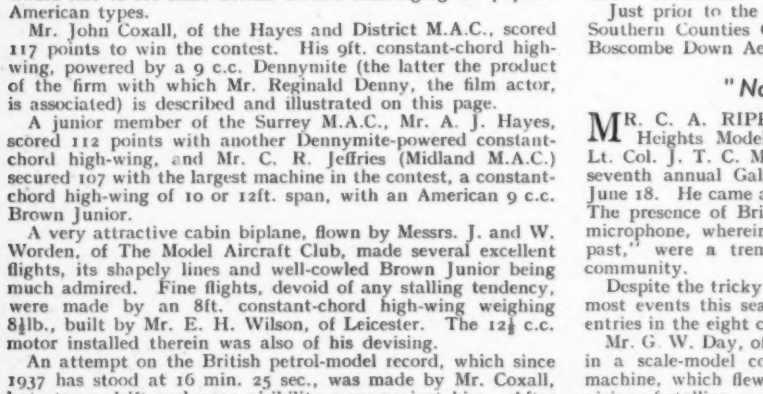
MR. C. A. RIPPON and his colleagues of the Northern Heights Model Flying Club were fortunate in having Lt. Col. J. T. C. Moore-Brabazon, M.C., M.P., to open their seventh annual Gala at Fairey's Great West Aerodrome on June 18. He came at the invitation of Dr. and Mrs. Thurston. The presence of British pilot No. 1, and his speech over the microphone, wherein he described himself as a "relic of the past," were a tremendous encouragement to the modelling community.

Despite the tricky wind and periodic rain which have marred most events this season, there was the record number of 407 entries in the eight contests held, last year's total being 241.

Mr. G. W. Day, of Northern Heights, won the *Flight* Trophy in a scale-model contest which attracted 12 entries. His machine, which flew exceptionally well and without any suspicion of stalling, was described as a 1911 Caudron monoplane. Sundry characteristic features certainly suggested a precursor of the shapely monoplane, circa 1912, with 5-cylinder 45 h.p. Anzani radial, which was the only Caudron monoplane of which the writer can find any record in sundry works of reference. Possibly one or other of those experts in aeronautical antiques, Messrs. R. G. J. Nash and R. O. Shuttleworth, can enlighten us further, and also as to the identity of the decidedly uncommon 4-cylinder "X" motor. A description of the model appears below.

Leopard Moths built by Messrs. Wakefield (Barnes D.M.A.S.), and S. R. Crow (Blackheath M.F.C.) were the runners-up. There were also three other Leo-

(*Cont. on opposite page.*)



Historical, to scale, and a flyer—Mr. G. W. Day won the *Flight* Trophy for scale models at the N.H.M.F.C. meeting with this 1911 Caudron.

The 1939 model no longer has the characteristic Stinson cowling.

THE NEWEST RELIANT

Detailed Improvements to the 1939 Model

SOME of the more expensive American private-owner types, and, in particular, the Stinson Reliant, have reached such a pitch of luxury refinement that the makers must find it difficult to know what they can do for their next year's models. That is, short of redesigning the whole machine to provide vertical ascent and descent or some other outstandingly new aerodynamic feature. Within present design limits the Reliant is already as safe as any conventional aeroplane can be, and all that the makers can do is to improve the details.

The most noticeable outside difference between the 1939 and the 1938 Reliant is in the design of the cowling, which is now without the fillet excrescences and has a smaller overall diameter. It is horizontally hinged in sections to permit immediate access to engine incidentals, and the whole lot can be removed fairly simply for top overhauls. What the Americans call "styling" has also been changed and the cowling louvres redesigned. Otherwise, the only other exterior changes to be seen are in a slight increase to the area of the rudder horn balance, and in the fact that the steps on each side are now retractable.

Recently we had a chance of riding in one of the new SR-10C models, with 260 h.p. Lycoming engine and two-position Hamilton airscrew. This machine was about to be delivered to Mr. Marshall, of Cambridge, by Brian Allen Aviation, of Hanworth, and is fairly adequately equipped with extras such as full free gyro blind-flying equipment, Grimes retractable landing lights, D/F radio, outside temperature gauge, and electrically heated pitot head.

In the air the effect of the larger rudder balance area is noticeable. Not only is the rudder control lighter, but the machine has not quite the same degree of rigid directional stability. In other words, it is more practical now to turn on the rudder alone; previous Reliants would, after being yawed off by the rudder, return at once to their original course. Another little point is that the vacuum-operated flap lever, which is in the form of a knob on the dashboard tray, now has a little stop. This prevents the control from being moved completely from the "flaps down" to the "flaps up" position, and means that if the flaps are hurriedly raised their movement is very slow and is not likely, therefore, to alter the machine's characteristics at a critical moment. In standard form, and ready to be flown away, the SR-10C costs £2,835 at Croydon.

MODEL AIRCRAFT

(Concluded from opposite page)

pards, a Cub, a Lysander, and a Renard fighter, all of them perfectly successful. Each model made two flights, and received additional points for design, workmanship, and faithfulness to prototype.

In the scale-model section of the *concours d'elegance* Mr. H. J. Towner won for the third year in succession. His entry was the Envoy recently described on this page. A contest for pushers resulted in duration which, with such abbreviated fuselages, were astonishing. The winner, Mr. R. Mackenzie (Blackheath M.F.C.), achieved 114 sec., rise-off-ground, which exceeds the existing record by a handsome margin.

Among other interesting models were Mr J. Rees' low-wing monoplane with highly polished monocoque fuselage, and undercarriage retracted by means of burning touch-paper; Mr. C. R. Moore's twin-motored day-bomber, recently described in *Flight;* and a successful high-wing composite by Messrs. Boardman and Oliver, of the R.A.F, Cranwell. The respective spans of the components were 25in. and 42in., and weights 2¾oz. and 10½oz.

Flying Scale Champion

MR. DAY'S trophy-winning Caudron was a copy of the design with which Mr. Henry Struck, of the U.S.A, won the flying scale trophy in the 1938 Nationals. It has a span of 30in., and wing-area of 1 sq. ft., the scale being 1¼in. to 1ft. The weight is 4⅝oz.

Each wing is attached by means of concealed aluminium tubes which slip over stout wires projecting from the fuselage sides. The bracing, which is purely for veracity to the original, consists of threads which are anchored by wire loops to a bamboo strut below the fuselage, pass through tubes in the wings, and are tensioned by a rubber band which rests on the bamboo pylon above the fuselage. Balsa sheet is employed to secure the characteristic scalloping of the wing and tail trailing edge.

Laminated balsa sheet is used for the wheel rims, the spokes being of $\frac{1}{32}$in. diameter bamboo. The wheel diameter is 2½in. Bamboo is used for the undercarriage struts, and springing is contrived by an 18-gauge wire axle which is flexibly coupled to the horizontal member. A 10in. airscrew is turned by 8 strands of ¼in. flat rubber. The dummy motor has cylinders composed of alternate layers of thin and thick balsa sheet, thus obtaining the effect of cooling fins. Solid balsa bushed with hardwood forms the crankcase-cum-nosepiece. In the contest Mr. Day's model flew for 36 seconds, but under more favourable conditions has exceeded 60 seconds, both of which figures are pretty good going!

King Peter Cup Gliders

THE event of the month will be the S.M.A.E. glider contest for the King Peter Cup, which will be held at Fairey's Aerodrome on July 22-3. It is not yet known what countries will be represented.

Lord Wakefield has contributed £250 towards the expenses (in addition to £300 towards the Wakefield Cup crusade to New York), and is to give a banquet to the King Peter teams, at which it is hoped that he will preside.

CHEAPER FLYING FOR WOMEN

THE National Women's Air Reserve—the organisation at present functioning at Romford—is seeking to spread its activities to other centres, and with the object of raising funds to train more women flying instructors, it held a ball at the Hyde Park Hotel, London, last Friday. At present, instruction at Romford is carried out by Mrs. Arthur Patterson and her assistant, Miss Joan Hughes. Special concessions, including 50 per cent. of flying over and above the C.A.G. 10 hours' allowance, will be made to members of the N.W.A.R.

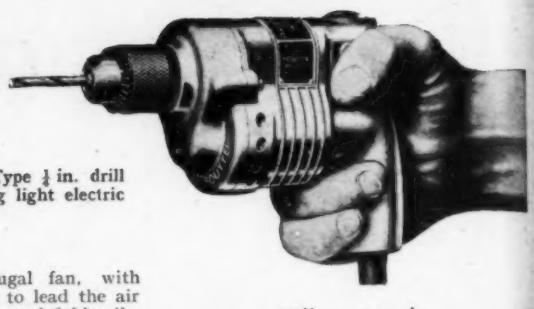
It is not felt that the N.W.A.R. conflicts with the newly formed Women's Auxiliary Air Force, as the latter is primarily concerned with ground duties.

THE INDUSTRY

LIGHTWEIGHT DRILL-POWER

ALTHOUGH the Desoutter "B" type ¼in. drill gun was, when first introduced, the only pistol-grip electric drill which was light and small enough to be used by one hand, and has since been imitated in many countries, it still possesses two features which are claimed to be exclusive. The first is the use of a former-wound armature in place of the machine-wound type usually found in similar small lightweight tools. Desoutter Brothers, Ltd., believe that former winding produces what is, in effect, an industrial motor in miniature, and allows them to give a high rating for the capacity of the tool, while still retaining an adequate margin of safety in overload.

The second feature is the incorporation of a bottom-brush holder in the pistol grip. This feature, which is a Desoutter patent, enables full length brushes to be used with a resultant economy in maintenance.



The Desoutter "B" Type ¼ in. drill gun is a pioneer among light electric drills.

A high-speed centrifugal fan, with carefully designed ducts to lead the air stream past the armature and field coils, reduces the temperature of the motor to a minimum. In fact, it is claimed that the temperature rise under continuous full load conditions is only 65 degrees F., which compares favourably with the 80 degrees F. permitted in the B.S.I. specifications.

"B" type Desoutter drill guns are available in a range of capacities from $\frac{3}{16}$in. to $\frac{5}{16}$in. and in speeds from 5,000 r.p.m. down to 450 r.p.m. Further details of this type of tool are obtainable from Desoutter Brothers, Ltd., The Hyde, Hendon, N.W.9.

FOR SOIL STABILISATION

THERE are many who feel that the day of the turf aerodrome, particularly on clay or similar non-porous subsoils over which heavy traffic is to be expected, has come to an end, or will do so very shortly. In this connection it is an interesting fact that in America the authorities have been quick to appreciate the advantages of soil stabilisation in connection with the runways and aprons of aerodromes.

Until quite recently this method of soil treatment in Britain was regarded with a certain scepticism, but in view of the progress made on the other side of the Atlantic, together with the results of research and experimental work that have been carried out over here, the advantages of soil stabilisation are rapidly winning general approval.

In England two well-known companies have been closely co-operating for some time on this type of work. In the belief that soil stabilisation must come, and realising that the work and responsibilities entailed were rapidly exceeding the limits of the two organisations, it was decided to form a separate company, known as British Runways Ltd., the controlling interests of which are held by the En-Tout-Cas Co., Ltd., and British Bitumen Emulsions Ltd.

Although British Runways Ltd., has only been incorporated for little more than a month many thousands of pounds' worth of work is already in hand. A contract has been started for the construction of an apron in front of the hangars at Ringway Airport, Manchester, while a War Office contract for the construction of an extensive parade ground at Devizes is also well in hand. Incidentally it should be noted that soil stabilisation can be applied to other spheres, such as road and path making.

Until the formation of the new company it had been necessary to add and mix the soil with the correct proportion of bitumen emulsion by rather crude methods. To overcome this difficulty a special Woods mixing machine has been imported from America. This machine is capable of mixing and laying four thousand yards of runway per day. It is of the same type as those which have been used in America on most of the big runway jobs which have been carried out for the United States Army and other Government departments.

Although British Runways, Ltd., is a new company, it is backed with the knowledge and experience gained by the two controlling organisations, which, during the past two or three years, have been carrying out a great deal of experimental work and practical testing under the supervision of American experts brought over to this country specifically for this purpose.

All enquiries concerning the new company should be addressed to British Runways, Ltd., whose offices are at Eagle House, 109, Jermyn Street, London, S.W.1.

AERONAUTICAL PATENTS

(Published July 6, 1939.)

30518. ANDREWS, W. R.: Aircraft construction (506,915)

34176. DUNLOP RUBBER CO., LTD., BEHARREL, G. E., WRIGHT, J. and TREVASKIS, H.: Fluid-pressure apparatus for controlling the operation of brakes for aircraft (507,162)

34314. MARCONI'S WIRELESS TELEGRAPH CO., LTD., and WRIGHT, G. M.: Direction-finding radio receivers (507,181).

1087. GOLDSMIDT, R.: Means for indicating ice formation (506,843).

4729. FAIREY AVIATION CO., LTD., and HILTON, L. M.: Air-brake for aircraft (507,103).

29542. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Guides for the valves of liquid-cooled internal combustion engines (507,030)

(Published July 13, 1939.)

35572. DELANEY, C. T., and GALLAY, LTD.: Radiators for motor vehicles and aircraft (507,507).

7767. ROE AND CO., LTD., A. V., and TAYLOR, R. F.: Securing of sheet metal or other parts to structural members (507,358).

24919. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Automatic gear-changing devices for two-speed gears (507,460).

26182. TELEFUNKEN GES. FUR DRAHTLOSE TELEGRAPHIE: Radio direction-finding systems (507,461).

28902. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Cabins for aircraft (507,395).

13120. SPERRY GYROSCOPE CO., INC.: Directional gyroscopes (507,407)

Hillson Results

AT the third annual general meeting of F. Hills and Sons, Ltd., held recently at Stockton-on-Tees, the chairman, Mr. A. G. Murrell, said that the aircraft side of the company's business had improved greatly throughout the year, although they had again been disappointed in the aeronautical plywood factory. This factory, incidentally, was now running at a profit, and he looked for a good return which would in part offset last year's disappointment.

The aircraft section was operating on a large scale, and had received a big order from the Air Ministry. Great efforts were being made to consolidate and improve the company's position in the aircraft industry.

The chairman said that profits for the past year amounted to £17,158. On deducting the debit brought forward there was a surplus of £12,421 available for distribution. A dividend of 6 per cent, less tax, would be paid.

In Brief

J. SAMUEL WHITE and Co., Ltd.,—the well-known shipbuilders and engineers of West Cowes—have changed the address of their London offices to Golden Cross House, Charing Cross, London, W.C.2. (Abbey 5064-5).

* * *

The first ticket purchased in this country for the new Pan-American Airways transatlantic passenger service was handed across the counter last Thursday at the Haymarket offices of United States Lines to Major A. P. Woodburn-Bamberger, D.S.O. Major Woodburn-Bamberger's passage was booked in connection with a business trip on behalf of his firm, Louis Bamberger and Sons, the well-known timber importers whose name has been linked with the aircraft industry since the earliest days.

* * *

The Broadway Engineering Co., Ltd., of Carlisle Road, London, N.W.9, has taken over the sole agency in this country for Machine Tools and Manufacturers Ltd., of Zürich-Oerlikon. This company specialises in high-speed lathes of all sizes, small milling machines with a table size of 8in. by 26in., bevel gear generators for cutting up to diameters of 64in. and rigid radial drilling machines.

* * *

Two designs of basement air raid shelters, conforming to the requirements specified in the *Draft Provisional Code for Air Raid Shelters* issued by the Home Office, have been prepared by the British Steelwork Association. The designs—a frame type and a wall-bearing type—are in compliance with the specified loads and stresses. They provide for a wide range in the size of basements. Lithograph copies of the designs are available from the Association's offices at Steel House, Tothill Street, London, S.W.1.